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A Guide to Decapod Crustacea from the Canadian Atlantic: Anomura and Brachyura

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A GUIDE TO DECAPOD CRUSTACEA FROM THE CANADIAN ATLANTIC: ANOMURA AND BRACHYURA

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ABSTRACT

Pohle, G. W. 1990. A guide to decapod Crustacea from the Canadian Atlantic: Anomura and Brachyura. Can. Tech. Rep. Fish. Aquat. Sci. 1771: iv + 30 p.

Twenty-three species of true crabs (Brachyura), or crab-like decapods (Anomura) known to occur in the Canadian Atlantic, are described. Included are 9 anomuran crabs (Families Paguridae, Parapaguridae, Lithodidae) and 14 brachyuran crabs (Families Majidae, Cancridae, Portunidae, Xanthidae, Grapsidae, Geryonidae). Multiple character comparisons are used to differentiate between higher decapod groups, families, genera and species. Distinguishing morphological features are identified on the illustrations and notes on colour, size, environmental temperatures, bathymetric and geographic ranges are included with species accounts. The descriptions are mostly based on original material obtained from cruises carried out by the Department of Fisheries and Oceans and deposited at the Atlantic Reference Centre, St. Andrews, New Brunswick, Canada.

RÉSUMÉ

Pohle, G. W. 1990. A guide to decapod Crustacea from the Canadian Atlantic: Anomura and Brachyura. Can. Tech. Rep. Fish. Aquat. Sci. 1771: iv+ 30 p.

Dans le présent document, on décrit vingt-trois espèces de brachyoures ou de décapodes ressemblant aux crabes (Anomoures) qui habitent les eaux de l'Atlantique à juridiction canadienne. On y décrit neuf crabes Anomoures (des familles Paguridae, Parapaguridae, Lithodidae) et quatorze crabes Brachyoures (des familles Majidae, Cancridae, Portunidae, Xanthidae, Grapsidae, Geryonidae). Au moyen de la comparaison des divers caractères, on a réussi à distinguer les groupes supérieurs, les familles, les genres et les espèces de décapodes. Les caractéristiques morphologiques discriminantes sont précisées sur les illustrations et des notes sur la couleur, la taille, les températures du milieu, la bathymétrie et les aires de distribution géographique sont incluses dans la description des espèces. La plupart des descriptions sont basées sur du matériel authentique obtenu lors d'excursions menées par le ministère des Pêches et des Océans et déposé au Centre de référence taxonomique de l'Atlantique, à St. Andrews au Nouveau-Brunswick, Canada.

INTRODUCTION

Decapods represent the largest (~8500 species) and most varied order of crustaceans, comprising about one-third of known crustacean species and ranging in size from a few millimeters to several meters. Shrimp, lobster, and crayfish, with their robust, well developed tail sections, exhibit one of the two basic body plans. This guide covers the crab-like or short-tailed decapods which have a flat abdomen, permanently bent under the body (except at mating), and no tail fan. Among this group are species of economic importance, which are commercially fished (see Elner (1985) for pertinent information). Also included are hermit and lithodid crabs, recognized by their asymmetrical abdomens. Species described here occur from the intertidal to abyssal depths. Shrimps and related forms from the Canadian Atlantic, whose elongated body includes an extended abdomen with terminal tailfan, are covered in a separate guide (Pohle 1988).

There is frequent need for ecologists, non-specialist taxonomists and fisheries personnel to identify marine organisms without having to refer to the specialized, detailed and scattered primary literature. Identification manuals with keys are available for some of the more common shallow-water decapod crustaceans (e.g. Williams 1974, 1984) but until now, there has been no single guide which includes the less well-known deep-water species from the northwest Atlantic. The present guide is based on the format used for Species Identification Leaflets by the Atlantic Reference Centre (ARC), Huntsman Marine Science Centre. The design should enable rapid identifications of species in the field, particularly among sets of similar-looking species. The guide represents a distillation of information from the latest primary systematic literature, along with ARC field and laboratory observations. It should be useable regardless of level of expertise in taxonomic identifications and familiarity with taxonomic jargon. Thus it complements formal, but more technically oriented references, which are often impractical or impossible to use in the field. By its nature, this manual is not authoritative, definitive, or comprehensive taxonomically. Consequently, all tentative identifications should subsequently be cross-checked with more detailed descriptions (see literature cited), or when definitive identification is required, the material should be referred to appropriate taxonomic specialists for final determination.

Species, which may be defined as a group of individuals able to interbreed with one another but not with members of another group, are the basic taxonomic category of classification. Groups of species are lumped into successively higher and larger categories according to shared features, which are regarded as a measure of relatedness. Therefore, groups of closely related species are all found within the same genus, just as all closely related genera are grouped into one family, and so forth, until this hierarchical process culminates in the category Phylum which unites all crustaceans. The actual animal group placed in any given category forms the taxon (e.g. Crustacea is the taxon for the category Phylum). Using the snow crab *Chionoectes opilio* as an example, the construction and terminology of this system, in descending order, are as follows:

CATEGORY	TAXON
Phylum	Crustacea
Class	Malacostraca
Order	Decapoda
Family	Majidae
Genus	*Chionoecetes*
Species	*Chionoecetes opilio* (Fabricius, 1780)

Additional subdivisions, not included above, exist for most of these latter categories (see Bowman and Abele 1982). They are necessary to accommodate large and very diverse groups, such as crustaceans. Every animal has a two-part name (binomen), consisting of generic and specific parts, and therefore the specific part is never used alone but in conjunction with the preceeding generic part when referring to the species name (see above example). Scientific names, which are accepted world-wide, are Latin, or latinized words from other languages. For each species, the scientific name, by convention, always appears in *italics* and here also in **bold-face type** in species descriptions. The use of the first letter of a genus name preceding the specific part is also permissible if the name has been previously spelled out on the page (e.g. *C. opilio* for *Chionoecetes opilio*). If a third word is included in a name, then the animal referred to is a subspecies. For example, the name *Hyas coarctatus alutaceus* refers to a majid crab of the

genus *Hyas*, the species *coarctatus*, and the subspecies *alutaceus*. The scientific name is followed by the author who originally described the species and the date of publication. If taxonomic changes have taken place subsequently to the authors description, author and date are enclosed in parentheses, e.g. ***Pagurus politus*** (Smith, 1882). Scientific names used reflect recent taxonomic changes; these updated names may not appear in published faunal guides (e.g. *Chaceon quinquedens*). Common or vernacular species names are provided to the right of scientific names, whenever available, e.g. ***Chionoecetes opilio*** (Fabricius, 1780) - Snow crab, queen crab. It should be remembered, however, that these names tend to vary depending on locality and are a frequent source of confusion. For example, *C. opilio* is not only known as either snow or queen crab in the Atlantic, but is also called the zuwai crab in the Pacific. Vernacular names given here agree with a checklist of North American common names by Williams *et al.* (1989). Geographic coverage in this guide includes all species known in Canadian Atlantic waters from the Scotian Shelf (Latitude 43°N.) to the Arctic but, as many species have relatively wide distributions, there is considerable overlap with more southerly areas.

This guide is also available on wet-strength paper to withstand heavy usage in the field.

The present guide is based on two major sources of information:

1. Material primarily collected from research cruises conducted by the Department of Fisheries and Oceans Canada, housed in the phylogenetic collection of the Atlantic Reference Centre at the Huntsman Marine Science Centre. The crustacean collection consists of approximately 3000 lots (10,000+ specimens).

2. Published descriptions from various faunal guides as well as the primary literature.

HOW TO USE THIS GUIDE

The novice is encouraged to become familiar with the general features of the group before proceeding to attempt identification, by using the introductory text and accompanying generalized diagrams below. A glossary (page 30) is provided for quick reference to definitions of technical terms. The core of the guide is organized into several sections, which separate larger groups into more specific subsets, before presenting individual species accounts. To identify a specimen, first proceed to the section (page 5) separating the two major groups of decapod crustaceans covered here. Depending on the particular group, up to three separate sections follow, distinguishing families, then genera and species. It must be remembered that specimens may often be immature, damaged, or otherwise incomplete, and this may therefore lead to misidentification. Morphological variations are especially likely to be encountered in juveniles which have not fully developed all adult structures. Comparable information is placed in the same relative position in each description and usually differs for at least two of the cases per given group. For an improved understanding, descriptive text should always be used in conjunction with illustrations.

The distinguishing morphological characters used in this guide are of two types (*NOTE*: character differences among species treated in this leaflet may not prove valid outside the Canadian Atlantic region):

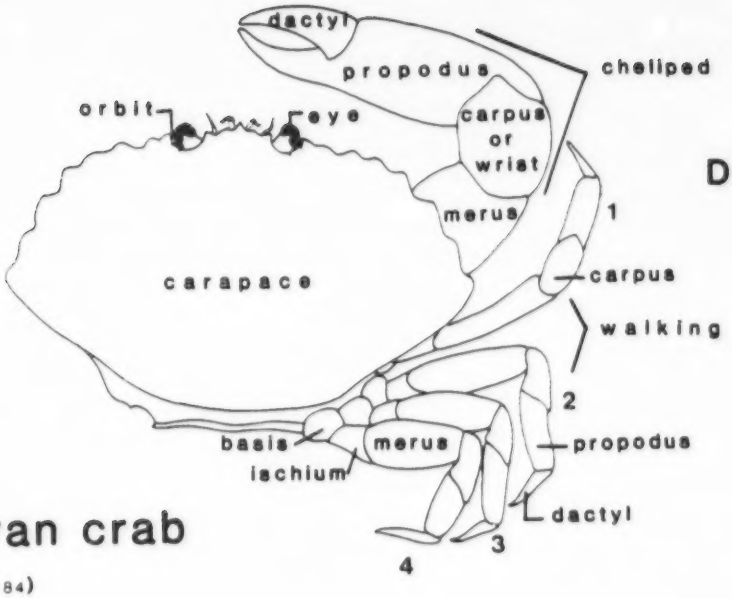
1. FIELD CHARACTERS - These include gross details (such as colour of the living animal, size, shape, relative positions and armature of appendages, etc.) that can often be observed without the aid of microscopes or dissections. Such characters may not prove definitive in all cases, but will generally suffice for tentative identification and separation of similar taxa at sea or for preliminary sorting in the laboratory. Size is given as carapace length (CL), measured from the posterior middorsal margin to posterior edge of eye socket, unless otherwise stated, or as carapace width (CW), measured dorsally at its widest part. In hermit crabs carapace measurements (CSL and CSW) refer to the length and width of the hardened anterior shield, and do not include the soft posterior part. Reported sizes are usually maximum adult sizes obtained from the literature or from specimens in the ARC collection. Given sizes and temperatures are rounded off to the nearest mm and °C, respectively.

2. LABORATORY CHARACTERS - These include smaller morphological details which usually require examination under a dissecting microscope. Such characters are denoted in *italics*.

Notes on colouration are based on live or freshly caught specimens and cannot usually be used when examining preserved material as colour changes or fades on preservation. Supplementary information on habitat, useful in confirming identifications, may be given following the list of diagnostic characters. Size, depth, environmental temperature and geographic distribution (given only for the western Atlantic), can be helpful in separating species. Illustrations are provided to augment details in the text; important features are marked and identified. Most illustrations are drawn from the literature but may include some modifications. Figures for some species without existing suitable illustrations were drawn from preserved specimens. Each genus is represented with at least one whole animal illustration, individual species are shown with those body parts essential for identification.

GENERAL MORPHOLOGICAL DESCRIPTION

This guide covers the symmetrical short-tailed true crabs (brachyurans) and anomuran crabs with asymmetrical abdomens (see Fig. 1 for terminology). All members of the former group have a narrow and extended abdomen which completely folds up against the ventral surface of the anterior cephalothorax. In the latter group the abdomen coils asymmetrically to one side so as to fit into empty gastropod shells. Whereas the Hermit crabs posses a terminal tail fan, the related anomuran lithodid crabs have become very crab-like, having a folding abdomen and lacking a tail-fan. Their kinship to hermit crabs is still evident from the asymmetrical abdomen of females. Segments of the cephalothorax are covered by the carapace, a hard protective shield consisting of fused dorsal segments of the head and thorax overhanging laterally to enclose the gills. The carapace may be formed into a rostrum anteriorly but in most crabs is reduced to a short frontal plate which may be variously armed. The armature of the rostrum and other exterior ornamentations of the carapace, such as ridges, grooves or hairs, are useful distinguishing characters. Antennules, which are the first pair of appendages below the stalked eyes, have a basal stem or peduncle consisting of the first three segments, followed by usually two flagella of various lengths. The antennae consist of 2-5 peduncular segments and extend distally into a whip-like flagellum with many articulations. Antennae often carry an outer branch on the second peduncular segment, resembling a broad scale or spine. The anterior mouthparts are formed by the mandibles, maxillules and maxillae (not shown in Fig. 1), followed by the first three pairs of thoracic appendages known as maxillipeds. The outermost third maxilliped often resembles a miniature leg. The remaining five pairs of thoracic appendages (pereiopods) comprise the true legs from which the name Decapoda (ten feet) is derived. Pereiopods each consist of seven segments, proximally to distally known as coxa, basis, ischium, merus, carpus, propodus and dactyl. The first pair of these appendages (chelipeds) are distally modified into pincers (chelae) and the outer branches (exopods) are missing. Concealed beneath the abdomen are the pleopods, males bearing two pairs of uniramous (single branch) appendages modified for copulation, whereas females bear four biramous (two-branched) pairs with setae to carry eggs. Hermit crabs have a tail fan terminally on the abdomen, consisting of a central telson and lateral uropods. On all crabs reproductive apertures for ovaries and testes are located between the bases of third and fifth pairs of legs, respectively. Male crabs of many species also have larger pincers than females. In contrast to males, mature female crabs have enlarged abdomens in order to hold brooding embryos. Refer to the glossary (page 30) for the definition of other terms.



Dorsal view

Brachyuran crab

(after Williams 1984)

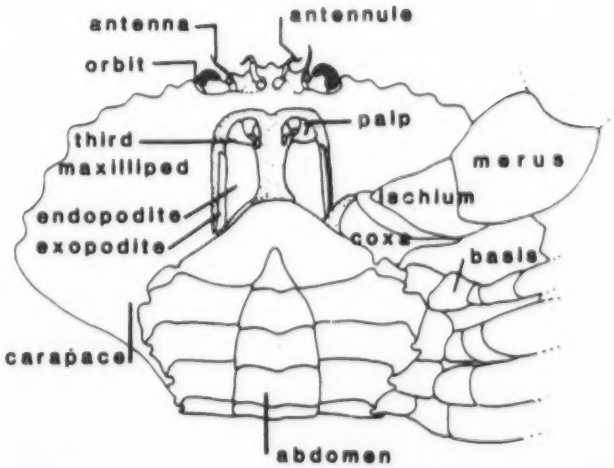
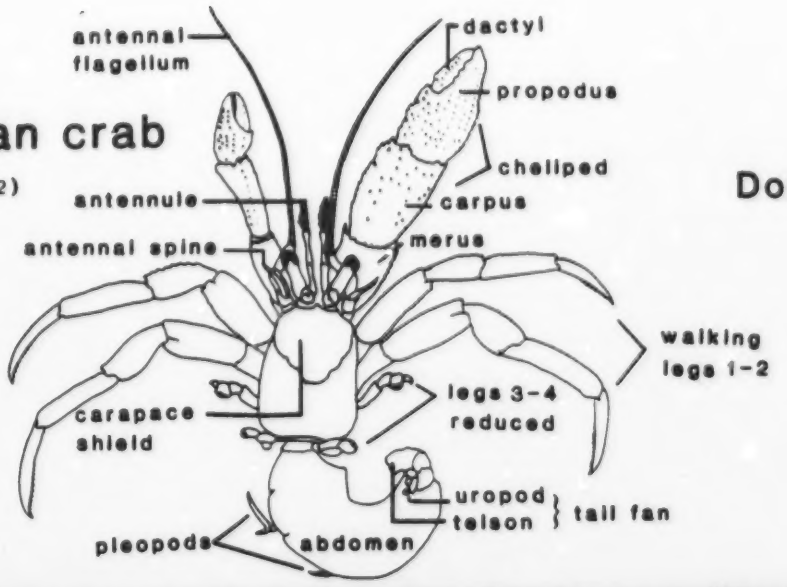


FIGURE 1

Ventral view



Anomuran crab

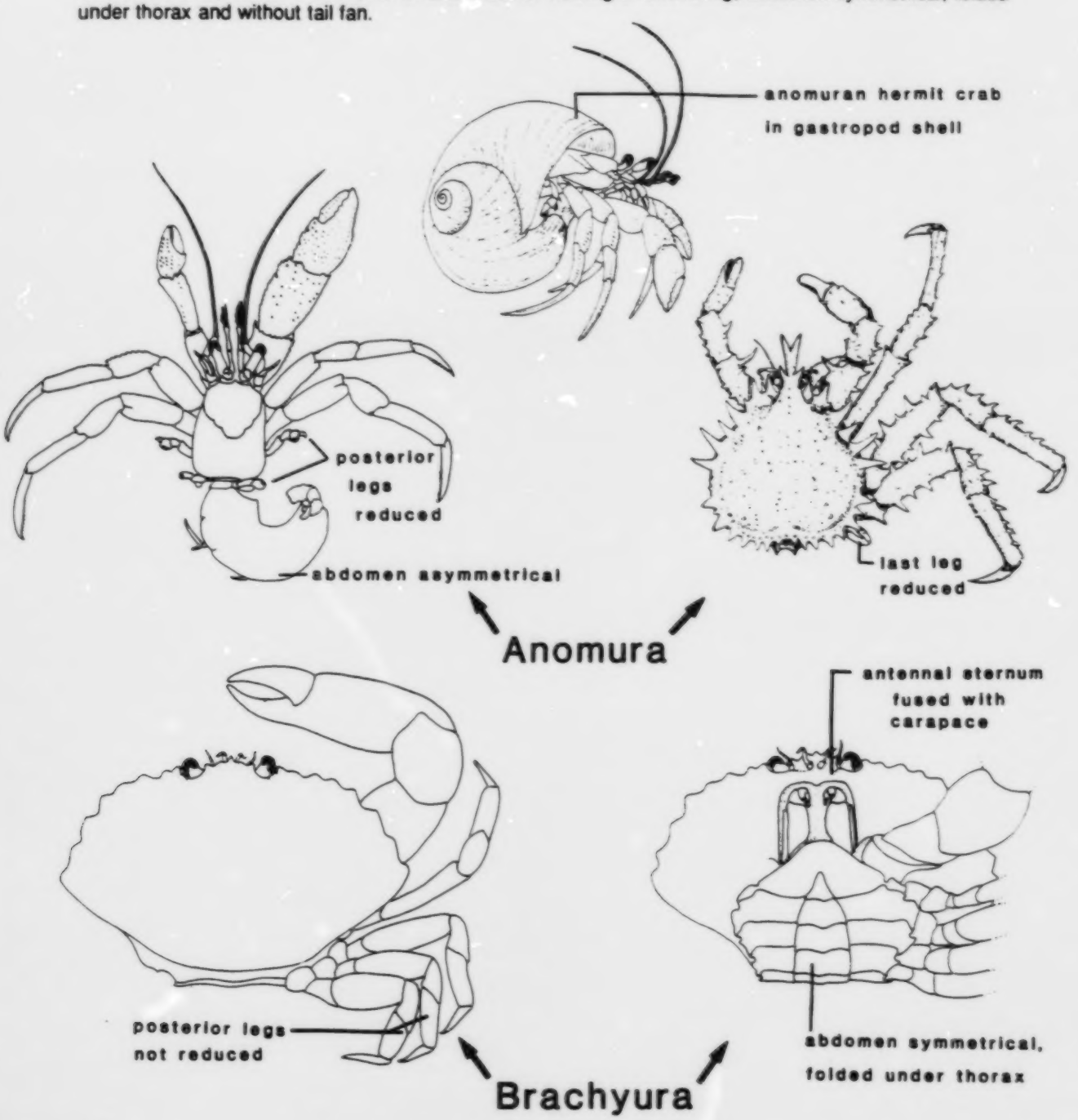
(after Hart 1982)

Dorsal view

HOW TO DISTINGUISH ANOMURAN AND BRACHYURAN DECAPODS:

Anomura: sternal plate in front of mouth and between antennae not fused with carapace; last 1 or 2 pairs of posterior legs reduced in size, not visible on the exterior and not used for walking or swimming; abdomen asymmetrical, for holding body in hollow objects and with terminal tail fan in male and female, or abdomen asymmetrical in female only, not held inside hollow objects and lacking terminal tail fan.

Brachyura: sternal plate in front of mouth and between antennae fused with carapace; posterior legs not reduced in size, visible on the exterior and used for walking or swimming; abdomen symmetrical, folded under thorax and without tail fan.

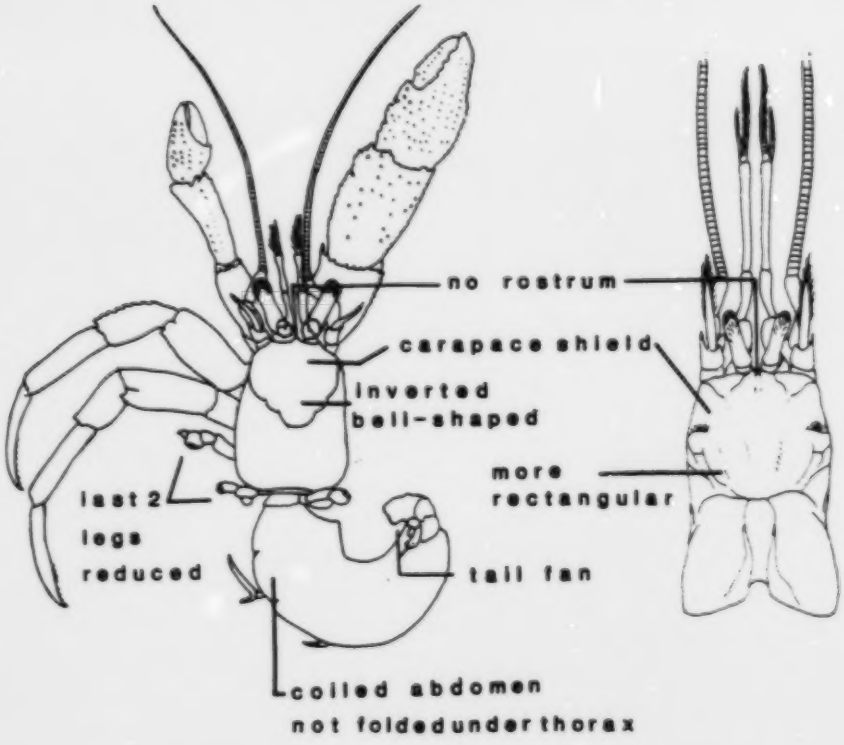


HOW TO DISTINGUISH THE FAMILIES OF ANOMURAN CRABS:

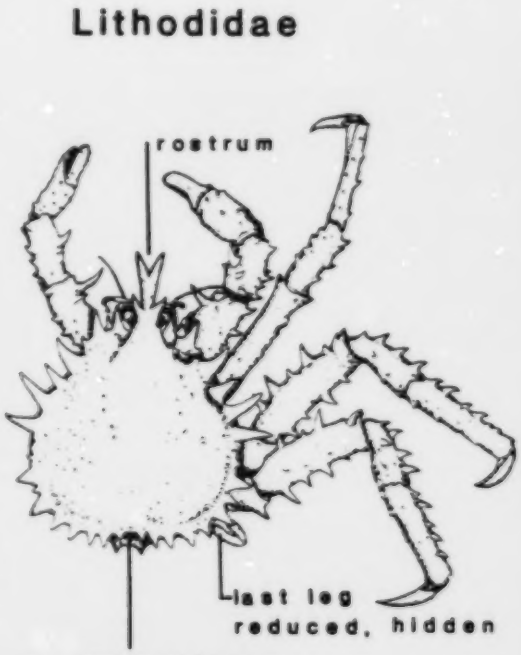
Paguridae - carapace shield inverted bell-shaped, anterior margin with small rostrum and lateral projections; abdomen asymmetrical, soft, unsegmented and spirally coiled, not folded under thorax; abdominal paired appendages lacking except for tail fan; posterior legs modified for holding body in gastropod shells; paired female genital openings on basal segment of both third walking legs

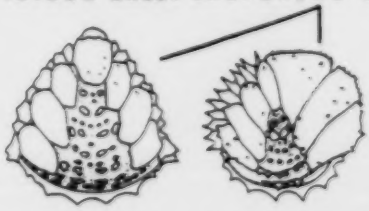
Parapaguridae - carapace shield more rectangular, anterior margin more or less straight; abdomen asymmetrical, soft, unsegmented and spirally coiled, not folded under thorax; in male paired appendages other than tail fan present on abdominal segments 1 and 2; posterior legs modified for holding body inside colonial sea anemones, coiled asymmetrically, not bent under thorax; associated with colonial anemone-like anthozoans; female genital opening on basal segment of left third walking leg only

Lithodidae - carapace anterior margin pointed, with distinct rostrum; abdomen symmetrical and broadly triangular in male, strongly asymmetrical and rounded in female; abdomen hard, segmented and not spirally coiled, folded under thorax and without tail fan as in true brachyuran crabs; abdominal paired appendages on first segment in female, lacking in male; not associated with mollusk shells or sea anemones; paired female genital openings on basal segment of third walking legs.



Paguridae Parapaguridae





male abdomen female abdomen

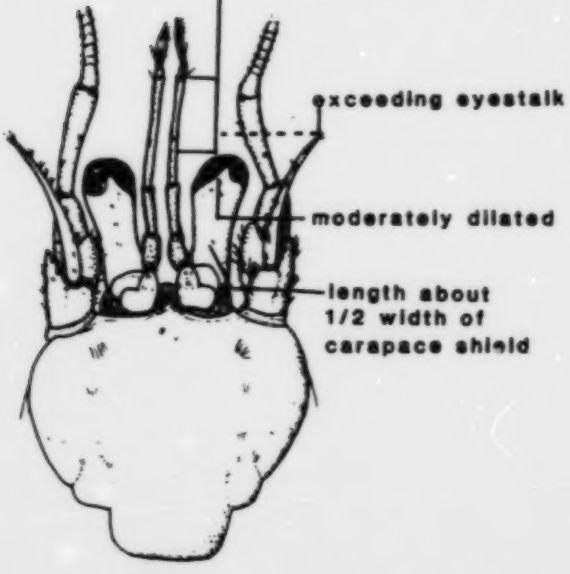
FAMILY PAGURIDAE - Hermit crabs

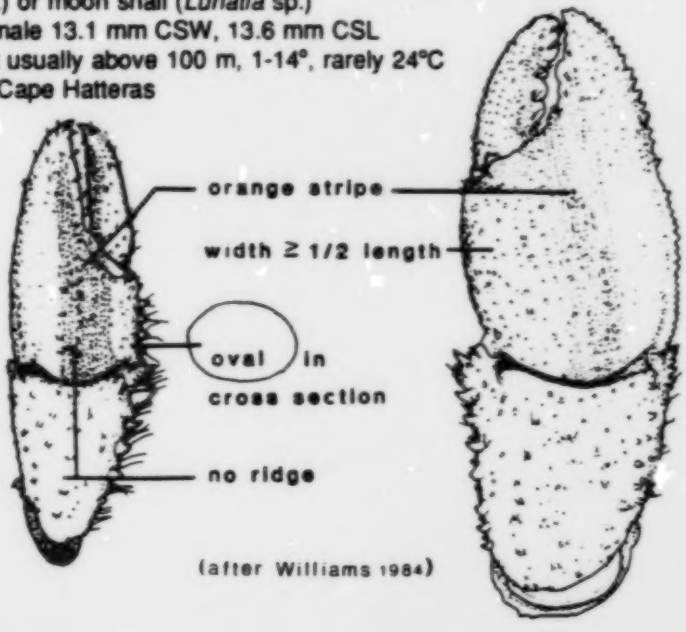
HOW TO DISTINGUISH THE SPECIES:

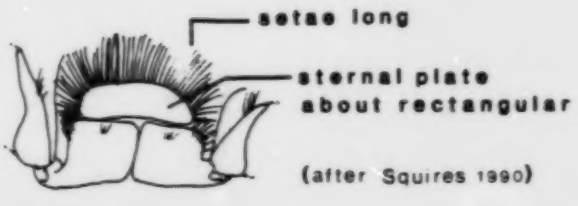
Remarks: One of the major characters for differentiating these hermit crabs is the upper, or outer, surface of the smaller pincer, which is either rounded (oval cross section), or is divided into two sloping facets by a spiny ridge running lengthwise (triangular cross section); this is sometimes obscured by a hairy surface. When estimating the relative length of the first 3 antennal segments in relation to the eyestalk, care must be taken that both structures are extended and parallel for comparison. The Canadian distributional range of *Pagurus longicarpus* is quite limited and it is the smallest species. *Pagurus politus* is usually found in deeper waters beyond the continental shelf (200 m). Of the five species most difficulty is likely to be encountered in differentiating *P. arcuatus* from *P. politus*.

1) ***Pagurus acadianus*** Benedict, 1901 - Acadian hermit crab

- carapace shield brownish, legs orange or reddish-brown, white near bases; hand of pincers with orange or reddish-orange stripe down middle (often persistent in preservative)
- eyestalk length about 1/2 width of carapace shield, moderately dilated cornea
- antennular peduncle exceeding eyestalks by about 2/3 length of third (terminal) segment
- antennal spine reaching beyond eyestalks
- both pincers stout, width of larger (right) pincer at least 1/2 length, granulate above, spines on lateral border, segment next to pincer sharply spined on inner border; first right leg with pincer much larger than left; palm of small (left) pincer oval in cross-section, upper surface flattened, not divided by ridge; *both pincers covered with low, round projections, prominent spines on inner border,* segment next to pincer sharply spined on inner border
- sternal plate between third legs about rectangular (width ~2 x length), bearing marginal setae
- usually in shells of whelk (*Buccinum* sp.) or moon snail (*Lunatia* sp.)
- male 17.4 mm CSW, 17.9 mm CSL; female 13.1 mm CSW, 13.6 mm CSL
- low water mark, tidepools, to 485 m but usually above 100 m, 1-14°, rarely 24°C
- Labrador, Gulf of St. Lawrence to near Cape Hatteras



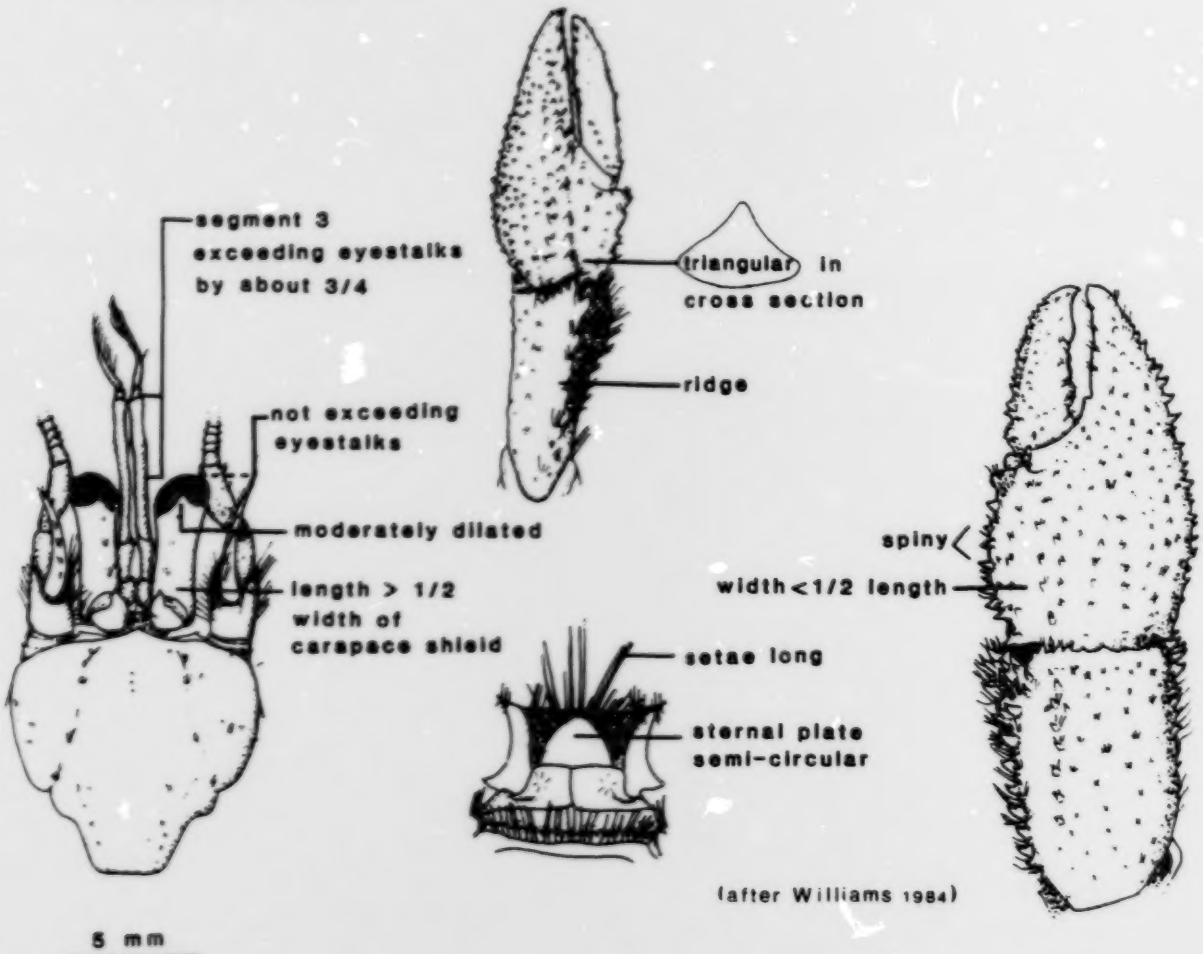




Pagurus acadianus

2) ***Pagurus arcuatus*** Squires, 1964 - Hairy hermit crab

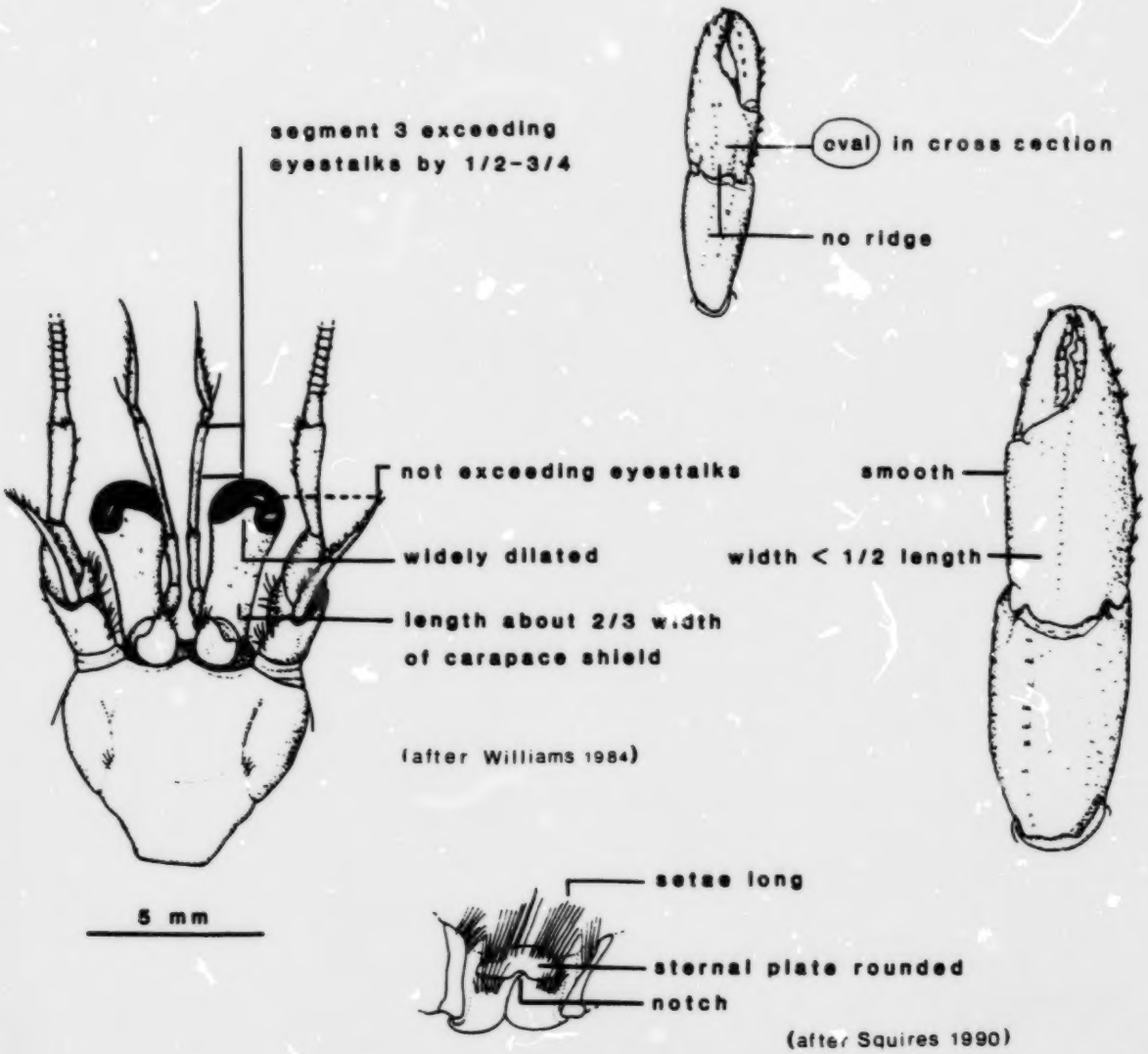
- rich brown to reddish-brown
- eyestalks slightly more than 1/2 width of carapace shield, moderately dilated cornea
- antennular peduncle exceeding eyestalks by about 3/4 length of third (terminal) segment
- antennal spine not reaching beyond eyestalks
- both pincers slender, width of larger (right) pincer less than 1/2 length; palm of small (left) pincer triangular in cross section, upper surface divided by longitudinal ridge into 2 sloping facets, *ridge bearing blunt spines which are not slanted inward*; both pincers hairy and outer surface covered with moderately sharp to sharp spines
- sternal plate between third legs with anterior portion almost semicircular and with many long marginal hairs
- mostly in shells of *Buccinum* sp. (few in species of *Colus, Neptunea* and *Lunatia)*
- male 14 mm CSW, 15 mm CSL; berried female 8 mm CSW, 8 mm CSL
- low water mark to 270m, 0-28°C
- Greenland to Maryland



Pagurus arcuatus

3) ***Pagurus longicarpus*** Say, 1817 - Longwrist hermit crab

- grayish or greenish-white, pincers with tannish stripe down middle, edged with white
- eyestalks about 2/3 width of carapace shield, widely dilated cornea
- antennular peduncle exceeding eyestalks by about 1/2-3/4 length of third (terminal) segment
- antennal spine not reaching beyond eye-stalks
- both pincers slender, width of larger (right) pincer less than 1/2 length; palm of small (left) pincer roughly oval in cross section; *relatively smooth or lightly granulate, row of weak spines only at edge and down middle*; hairless except for short hairs on inner edges
- sternal plate between third legs rounded and with posterior notch, width about twice length, with marginal hairs
- male 8 mm CSW, 7 mm CSL; berried female 5 mm CSW, 4 mm CSL
- from low tide line to 200 m, on a variety of bottoms, ocean, harbour beaches and channels, and especially estuaries; 8-18°C
- Bay of Fundy to Florida

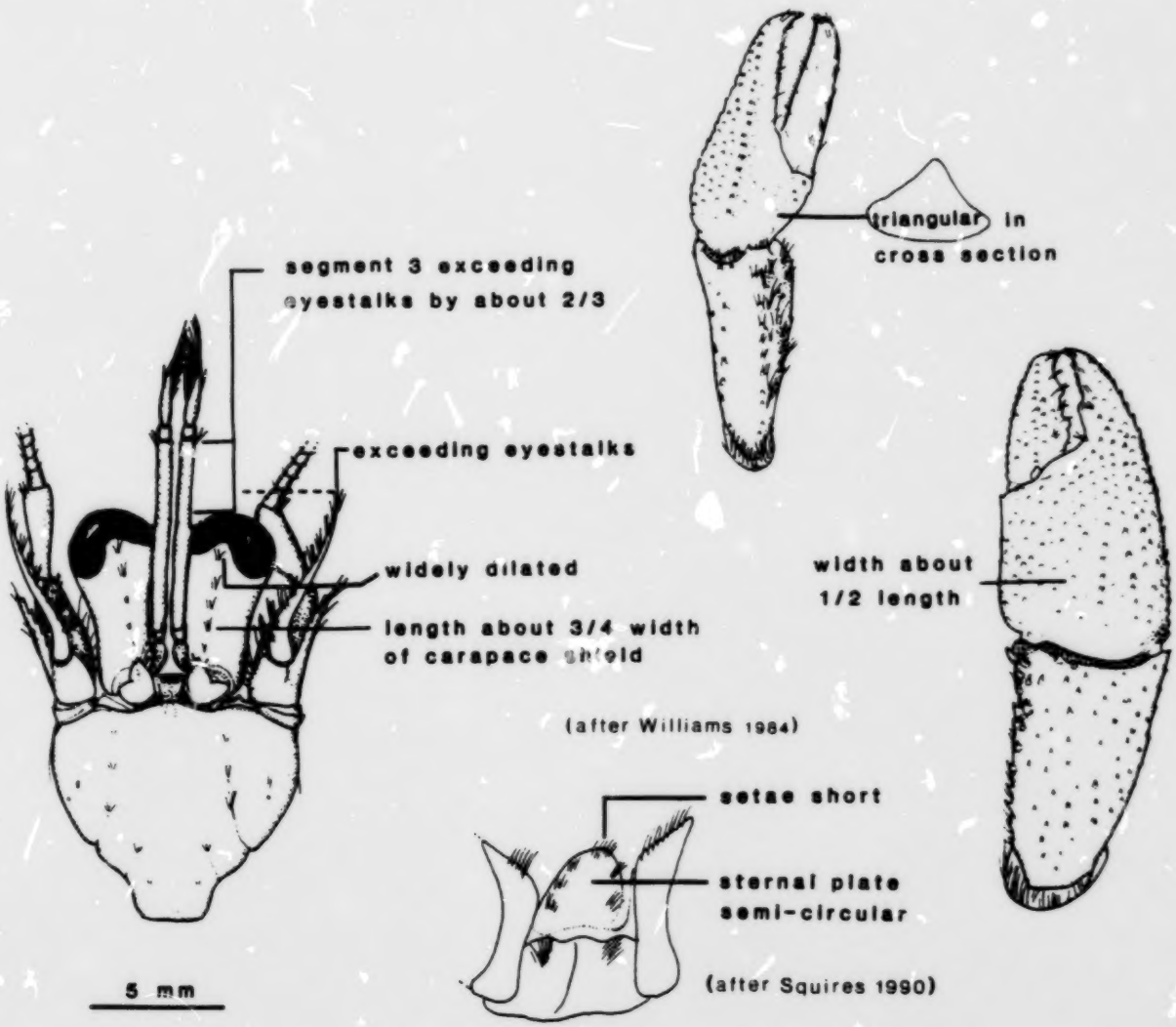


Pagurus longicarpus

4) ***Pagurus politus*** (Smith, 1882)

- pale orange, white tips on pincers and walking legs
- eyestalks about 3/4 width of carapace shield
- antennular peduncles, when extended, exceeding eyestalks by about 2/3 length of terminal article, widely dilated cornea
- antennal spine reaching beyond eyestalks
- both pincers slender, width of larger (right) pincer about 1/2 length; palm of small (left) pincer triangular in cross section, upper surface divided by longitudinal ridge into 2 sloping facets, *ridge bearing blunt spines which are not slanted inward*; both pincers mostly bluntly spined, lacking hairs on outer surfaces
- sternal plate between third legs similar to *P. arcuatus*
- male 14 mm CSW, 13 mm CSL; berried female 7 mm CSW, 6 mm CSL
- 10-1170 m, 7-18°C, mostly offshore on continental slope or near edge of continental shelf
- Georges Bank to Florida

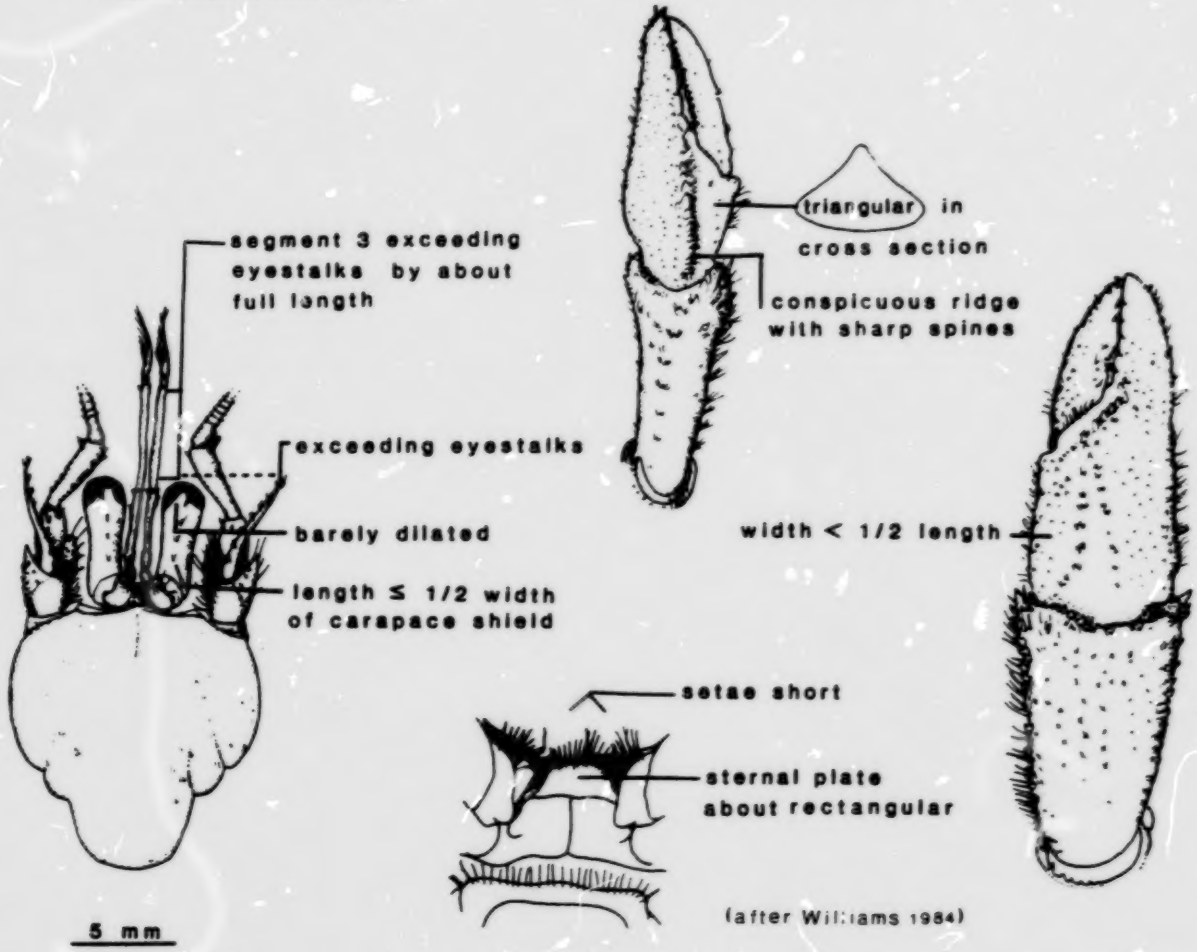
Note: specimens from deeper waters may be associated with colonial anemone-like anthozoans (as in *Parapagurus*), rather than with gastropod shells.



Pagurus politus

5) ***Pagurus pubescens*** Kroyer, 1838

- light red when small, pale pink with red markings when large; "clothed with yellow hair" (Rathbun 1929)
- eyestalks not more than 1/2 width of carapace shield, barely dilated cornea
- antennular peduncle, when extended, exceeding eyestalks by nearly full length of third article
- antennal spine exceeding eyestalks
- both pincers slender, width of larger (right) pincer less than 1/2 length; palm of small (left) pincer triangular in cross section, upper surface divided by conspicuous longitudinal ridge into 2 sloping facets, *ridge bearing a row of elevated sharp spines which are slanted inward*; pincers more or less hairy (less so than *P. arcuatus*)
- sternal plate between third legs more or less rectangular (width nearly twice length), bearing short sparse marginal setae
- usually found in shells of *Buccinum*, but also in *Neptunea, Colus, Lunatia* and *Thais*
- male 17 mm CSW, 16 mm CSL; berried female 11 mm CSW, 12 mm CSL
- usually offshore, 6-600 (mostly 10-110 m), rarely to 984 m, -2-5°C on a variety of bottoms
- Greenland to New Jersey

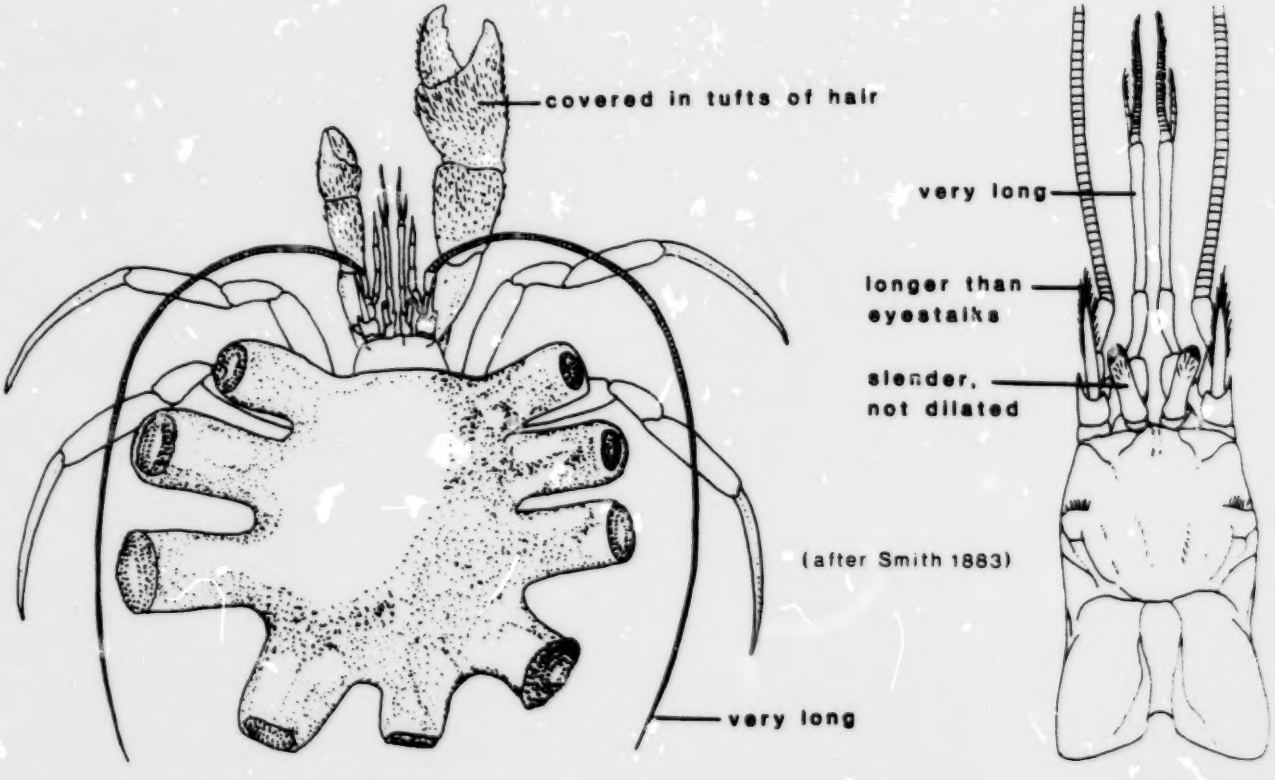


Pagurus pubescens

FAMILY PARAPAGURIDAE - Deepwater hermit crabs

HOW TO DISTINGUISH THE SPECIES:

1) ***Parapagurus pilosimanus*** Smith, 1879
   - pale, dull orange, darker at tip of legs
   - eyestalks more slender (but less than 1/2 width of carapace shield) and cornea smaller than in *Pagurus*
   - antennular peduncle exeeding eyestalks by more than length of third (terminal) segment
   - antennal spine reaching beyond eyestalks, flagellum very long, reaching far beyond walking legs (in *Pagurus* not beyond legs)
   - pincers covered with tufts of short hairs, granular projections on surface below hairs
   - male 13 mm CSL
   - 102-3864 m, 4-7°C
   - Nova Scotia to Guyana



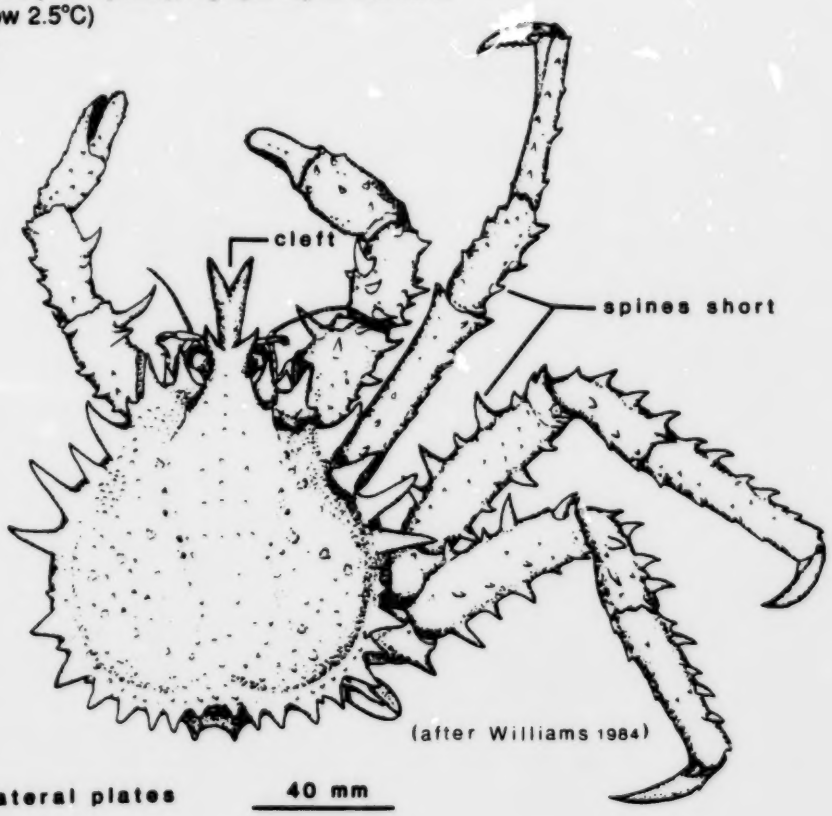
Parapagurus pilosimanus

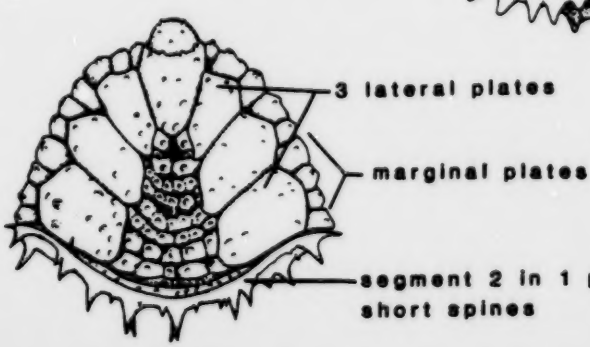
FAMILY LITHODIDAE - Stone and king crabs

Remarks: Among the three large lithodid crabs, the two species of *Neolithodes* are restricted to the deep sea. Adults of *Neolithodes agassizii* and *N. grimaldii* are easy to separate by their relative spine lengths, but this is problematical in juveniles, where spines are more similar.

HOW TO DISTINGUISH THE SPECIES:

1) ***Lithodes maja*** (Linnaeus, 1758) - Northern stone crab
   - light brown, purplish to yellowish red, spines darker, paler below
   - carapace pear-shaped, ornamented with many spines (longest along margin); about as long as broad exclusive of rostrum and marginal spines; rostrum long, cleft at tip, with lateral spines and ventral spine between eyestalks
   - all legs with spines, first legs with pincers shorter than other walking legs
   - abdomen with short spines on first visible (actual second) segment, tubercles on other segments; second segment entire, not subdivided into plates; remaining segments adorned with 3 pairs of lateral, 1 pair of large distal plates and smaller marginal plates (in female larger plates enlarged and smaller marginal plates absent on left side)
   - to ~150 mm CW, 175 mm CL (incl. spines), leg span up to 600 mm;
   - 65-790 m,1-10°C (rare below 2.5°C)
   - Davis Strait to New Jersey



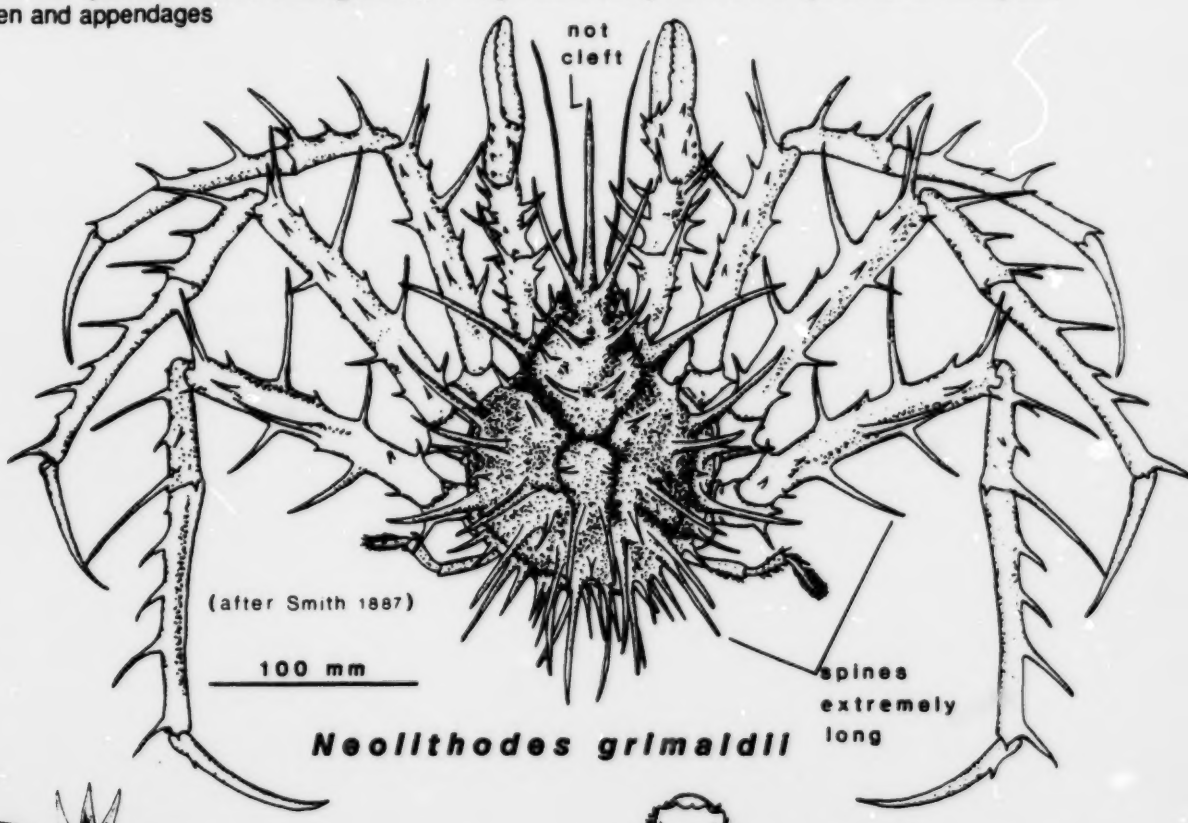


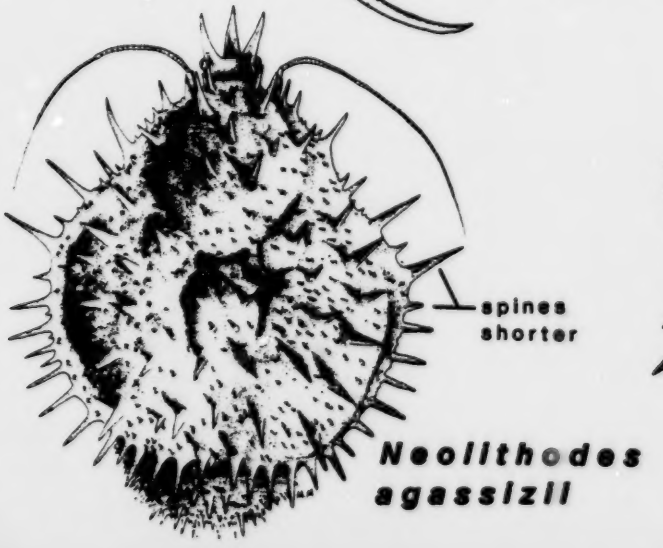
male abdomen

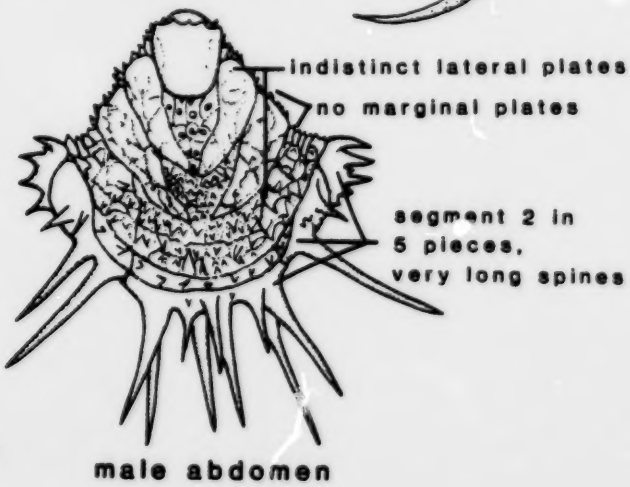
Lithodes maja

2) ***Neolithodes grimaldii*** (A. Milne-Edwards and Bouvier, 1894) - Porcupine stone crab
- brilliant crimson red
- carapace pear-shaped, adorned with many, extremely long (to 60mm) and sharp spines (marginal spines only little longer); rostrum consisting of 3 very long spines (1 central, 2 lateral)
- all legs with many long spines, legs with pincers shorter than walking legs
- abdomen with very long spines on first visible (actual second) segment which is subdivided into single central and 2 lateral plates; shorter spines on remaining segments; with 2 serially arranged plates distally
- male to 155 mm CW, 239 mm CL (incl. rostrum); leg span 760 mm
- 330-2000 m, ca. 2°C
- Arctic to off Nantucket; not in Gulf of St. Lawrence or Bay of Fundy

Note: another species, ***Neolithodes agassizii***, is very similar except for shorter spines on the carapace, abdomen and appendages







HOW TO DISTINGUISH THE FAMILIES OF BRACHYURAN CRABS:

Majidae (p. 17) - body usually conspicuously narrowed in front; eyes not completely enclosed dorsally and laterally in orbits; carapace with front produced into sharp-pointed paired forked horns or rostrum; *carapace almost always with hooked hairs* (except in *Chionoecetes*); antennules folding longitudinally; second segment of antenna fused with carapace portion below eye; wrist segment (carpus) of outer third maxilliped mouthpart articulating with preceding segment at middle or outer upper margin; last pair of walking legs unmodified, not adapted for swimming.

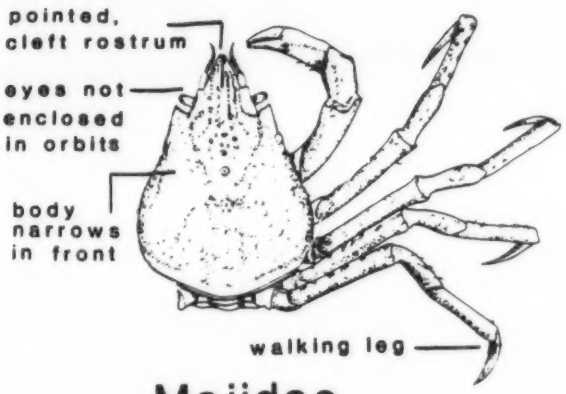
Cancridae (p. 20) - body broadened in front, oval or hexagon shaped; eyes enclosed in orbits; carapace not produced into a rostrum; front of carapace with 1 median and 2 lateral teeth; *capapace without hooked hairs*; antennules folding longitudinally; wrist segment (carpus) of outer third maxilliped mouthpart articulating with preceding segment at middle or outer upper margin; last pair of walking legs unmodified, not adapted for swimming.

Geryonidae (p. 21) - body broadened in front; eyes enclosed in well developed orbits; carapace not produced into a rostrum; front of carapace with 4 short teeth, uneven number of anterolateral teeth; *carapace without hooked hairs*; antennules folding transversely or transversely oblique; wrist segment (carpus) of outer third maxilliped mouthpart articulating with preceding segment at middle or outer upper margin; last pair of walking legs unmodified, not adapted for swimming.

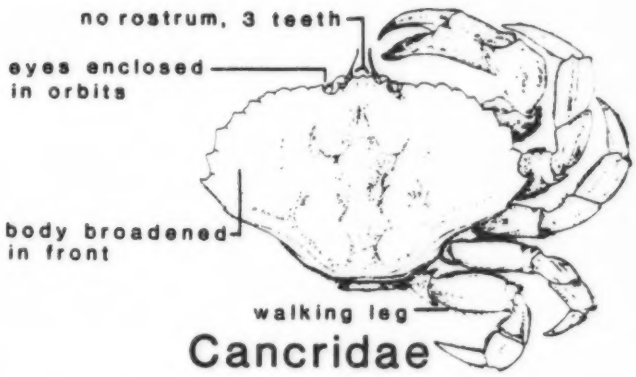
Portunidae (p. 22) - body broadened in front; eyes enclosed in orbits; carapace not produced into a rostrum; front of carapace with median notch or tooth and 5-9 lateral teeth; *carapace without hooked hairs*; antennules folding obliquely or transversely; wrist segment (carpus) of outer third maxilliped mouthpart articulating with preceding segment at middle or outer upper margin; last pair of walking legs modified, distally flattened and broadened into swimming paddle (only flattened in *Carcinus*).

Xanthidae (p. 26) - body broadened in front; eyes enclosed in orbits; carapace not produced into a rostrum; front of carapace divided into 2 lobes by median notch, without teeth; *carapace without hooked hairs*; antennules folding obliquely or transversely; wrist segment (carpus) of outer third maxilliped mouthpart articulating with preceding segment at middle or outer upper margin; last pair of walking legs unmodified, not adapted for swimming.

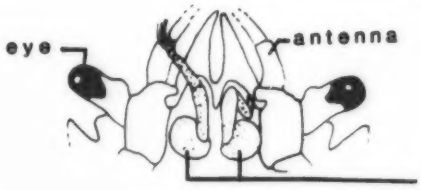
Grapsidae (p. 27) - body broadened in front; eyes enclosed in orbits; carapace not produced into a rostrum; front of carapace with median notch, no tooth; *carapace without hooked hairs*; antennules folding obliquely or transversely; wrist segment (carpus) of outer third maxilliped mouthpart articulating with preceding segment at inner upper margin; last pair of walking legs unmodified, not adapted for swimming.

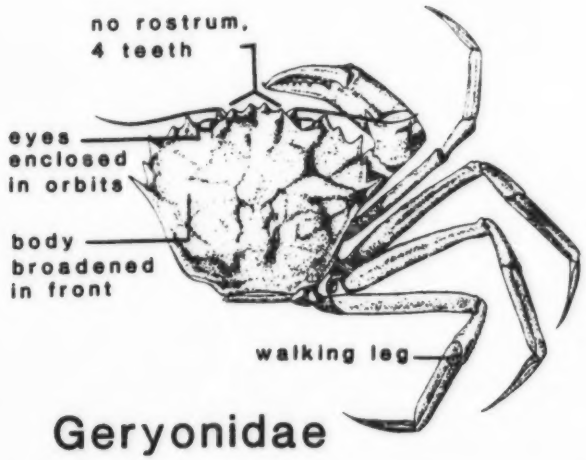


Majidae

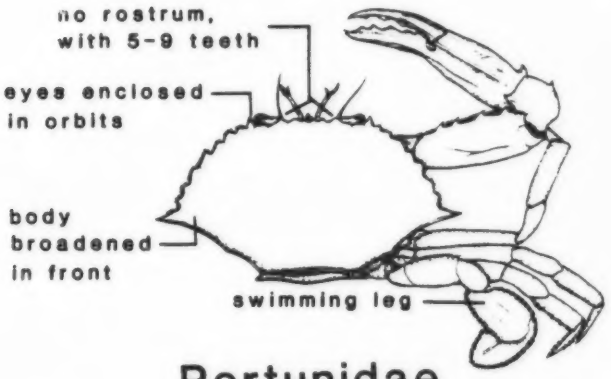


Cancridae

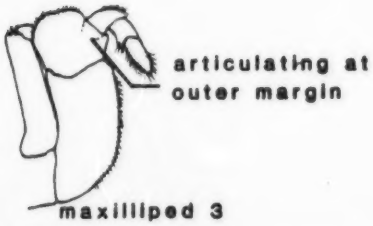


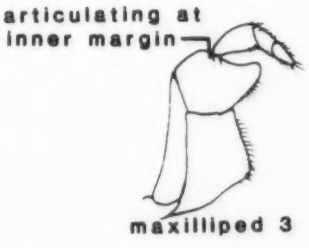


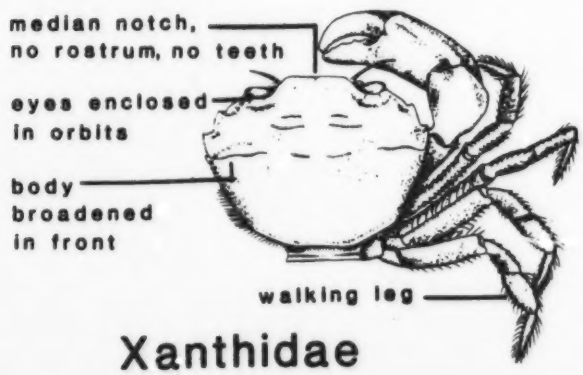
Geryonidae



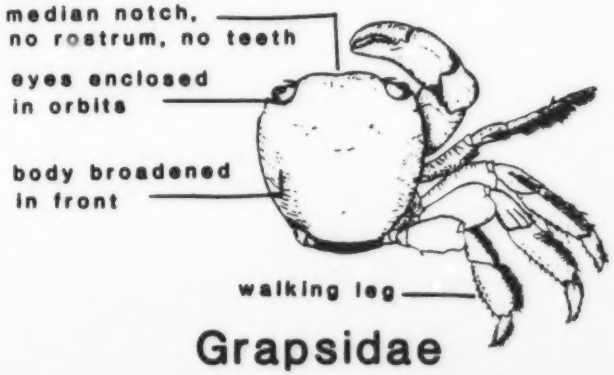
Portunidae







Xanthidae

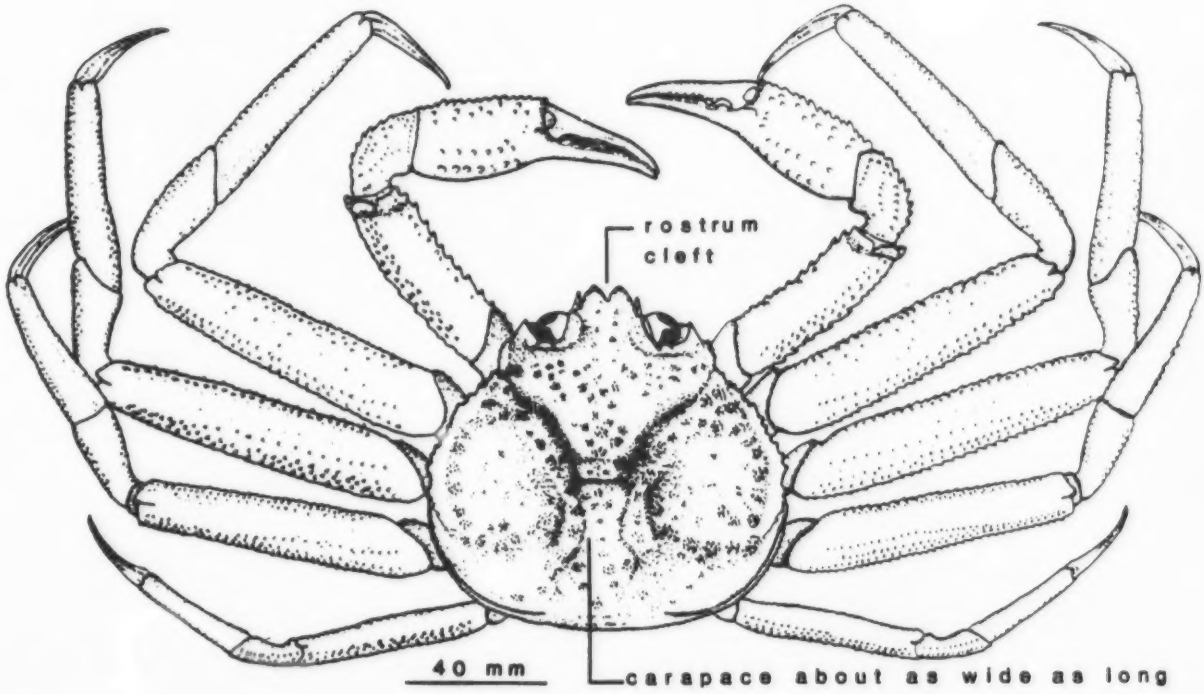


Grapsidae

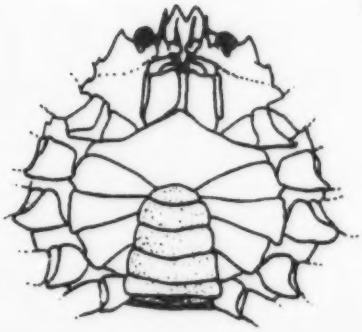
FAMILY MAJIDAE - Spider crabs

Remarks: Includes, *Chionoecetes opilio*, the commercially most valuable crab in Canada, with peak annual catches of up to 47,000 tons. Both species of *Hyas* are very similar but *H. araneus* lacks lateral wings and adults are larger. *Libinia emarginata* has a very limited Canadian distribution.

1) ***Chionoecetes opilio*** (Fabricius, 1780) Snow crab, queen crab
   - light brown or pinkish red above, yellowish white below
   - carapace length and width about equal, widest in back; usually not adorned with various organisms
   - rostrum short, flat and cleft, forming two adjoining horns which do not meet at tips
   - leg with pincer much shorter than first walking leg (especially in male)
   - male to ~156 mm CW, female to 95 mm CW and CL
   - 20-2222 m on mud and fine sand; -1-4°C
   - Arctic to Gulf of Maine

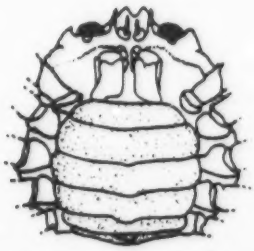


Chionoecetes opilio



male abdomen

(from Bailey & Elner 1989)

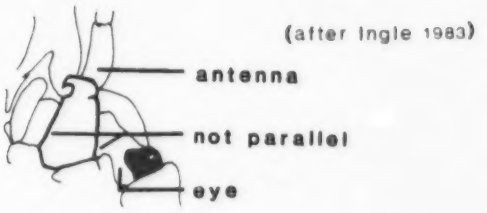


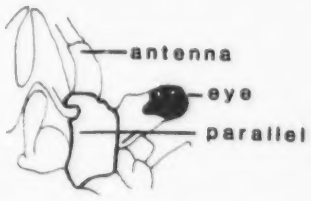
female abdomen

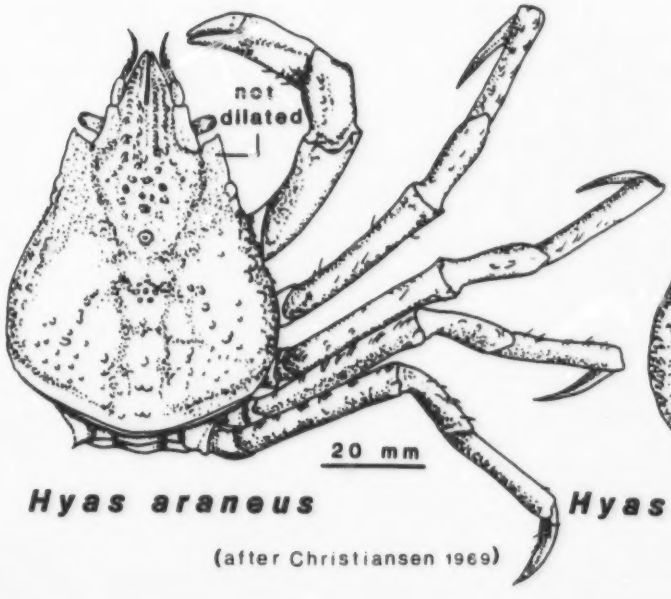
2) ***Hyas araneus*** (Linnaeus, 1758) - Atlantic lyre crab, toad crab
- reddish brown to olive dorsally, dirty white ventrally; legs banded red and orange; older specimens colourful
- carapace more or less triangular-shaped, longer than broad, widest at the rear half, narrowing towards front; without prominent toothed ridge behind eye socket; many specimens, especially older ones, bear various organisms such as barnacles, bryozoans (moss animals), tunicates or coralline algae as camouflage dorsally on the carapace
- rostrum elongate, flat and cleft, forming two adjoining horns which meet at tips
- antenna with peduncular segments 2 and 3 narrowing anteriorly
- leg with pincer stout, shorter than first walking leg
- male to 75 mm CW, 95 mm CL; female to 64 mm CW, 81 mm CL
- 1-52 m, rarely to 360 m, on stony, sandy or soft bottom, more common on latter; -1-15°C
- Labrador to Rhode Island

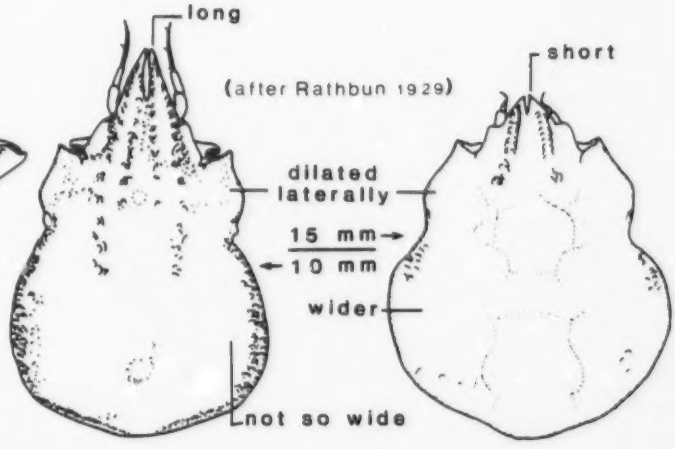
3) ***Hyas coarctatus*** Leach, 1815 - Arctic lyre crab, lesser toad crab
as *H. araneus* except:
- carapace violin-shaped, dilated laterally as prominent toothed ridge behind eye-socket
- rostrum with adjoining horns usually parallel but not touching for entire length
- antenna with peduncular segments 2 and 3 not narrowing anteriorly
- leg with pincer longer, about as long as first walking leg
- 42 mm CW, 61 mm CL *H. c. coarctatus*; 65 mm CW, 80 mm CL *H. c. alutaceus*
- 1-1650 m but usually less than 50 m; commoner on hard bottom; -1-15°C
- Arctic to North Carolina

Note: another form, *H. coarctatuts alutaceus*, which does not occur south of the Gulf of St. Lawrence, has a shorter rostrum and proportionately wider carapace than *H. coarctatuts coarctatus*; adults also tend to be larger; it occurs in the Artic down to the Gulf of St. Lawrence.



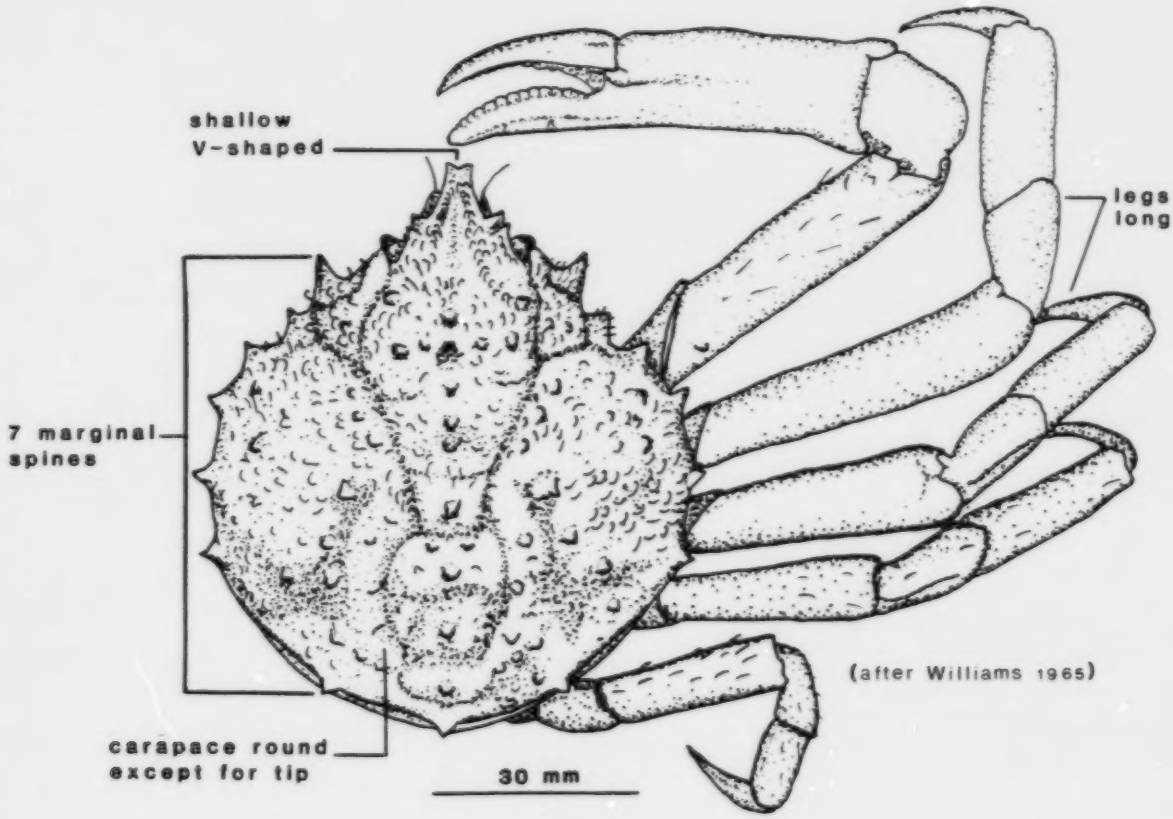






4) ***Libinia emarginata*** Leach, 1815 - Portly spider crab

- brownish or greyish- yellow, tips of fingers white
- carapace round except for pointed tip; covered with tubercles scattered among many spines; of larger spines 9 arranged along longitudinal midline, 7 on lateral margin behind eye; 2 in straight line behind eye, about 4 above gills
- rostrum with blunt diverging horns forming a shallow median V-shaped notch
- first leg with long, narrow pincers, twice as long in male (over 150 mm) as in female; other legs long, hairy, often overgrown with algae, dirt and debris
- male to 124 mm CW and CL; female with eggs 66 mm CW, 69 mm CL
- on almost any kind of bottom near low water line to 125 m, but usually above 50 m
- Nova Scotia to Gulf of Mexico



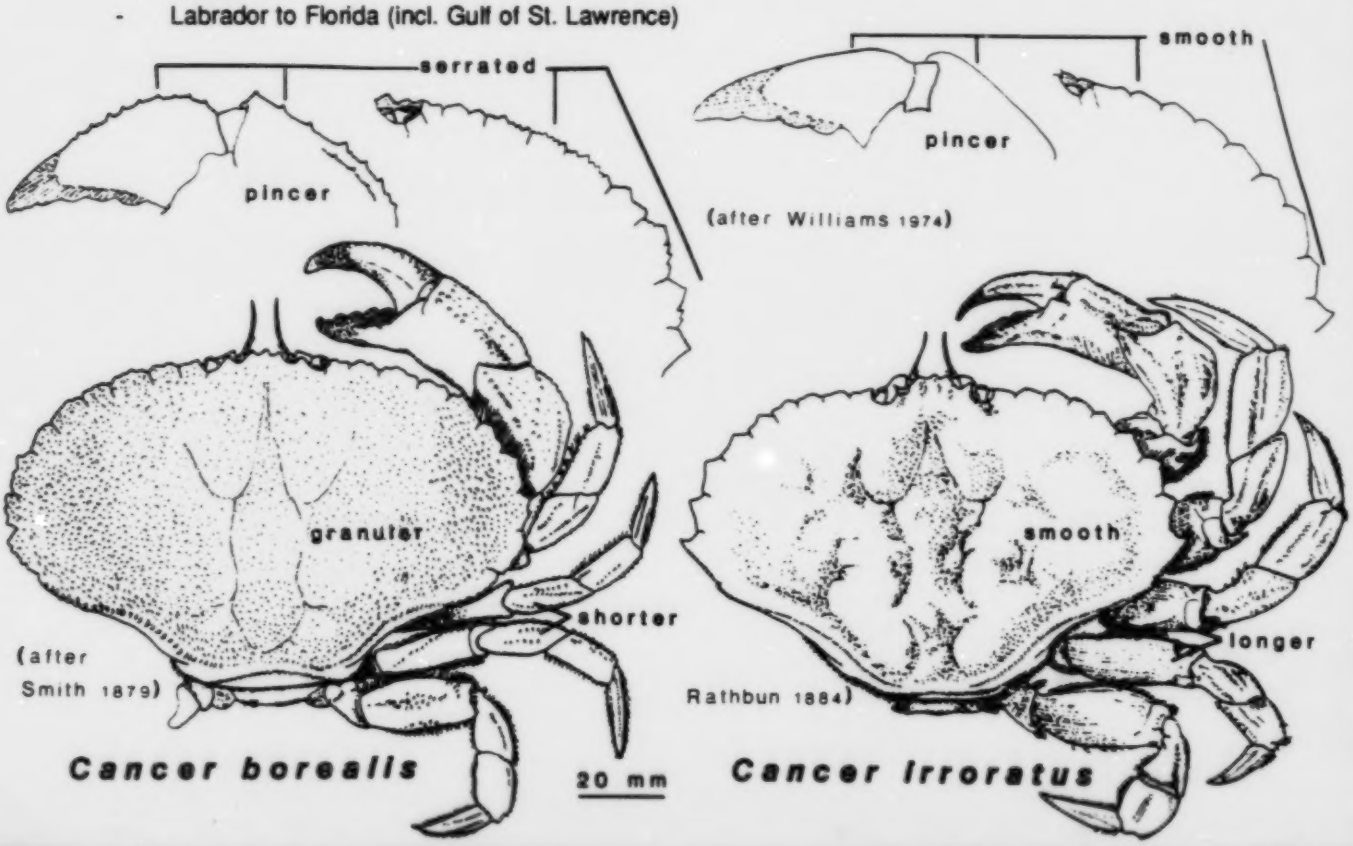
Libinia emarginata

FAMILY CANCRIDAE - Rock crabs

HOW TO DISTINGUISH THE SPECIES:

1) ***Cancer borealis*** Stimpson, 1859 - Jonah crab, northern crab
   - dull rosy to brick-red above and 2 curved lines of yellowish spots above, yellowish underneath; legs more or less purplish
   - carapace fan-shaped, 2/3 as long as wide and with granular texture; 9 teeth lateral to eye socket, each with several smaller points or denticles
   - orbital tooth on anterior margin pointed, in small juveniles not fused with adjacent anterolateral tooth
   - pincers with upper margin bearing small teeth or denticles
   - walking legs short, first and second walking leg only with last three segments extending beyond carapace
   - male to 160+ mm CW, 102 mm CL; female to 124 CW, 80 mm CL
   - intertidal (small to medium size) to 800 m (large size) on rocky bottoms, often among seaweeds; 1-14+°C
   - Nova Scotia to Florida (not in Gulf of St. Lawrence)

2) ***Cancer irroratus*** Say, 1817 - Atlantic rock crab
   - yellowish and dotted with dark puplish brown spots above, whitish to creamy yellow underneath
   - carapace fan-shaped, 2/3 as long as wide and with smooth texture; 9 teeth lateral to eye socket not subdivided into smaller points or denticles
   - orbital tooth on anterior margin rounded, in small juveniles fused with adjacent anterolateral tooth
   - pincers with upper margin granulate, lacking small teeth or denticles
   - walking legs longer, first and second walking legs with last four segments extending beyond carapace
   - male to 141 mm CW, 89+ mm CL; female to 106 mm CW, 44+ mm CL
   - low water mark (small to medium size) to 751 m (large size), usually on coarse sandy substrates; 1-25°C
   - Labrador to Florida (incl. Gulf of St. Lawrence)

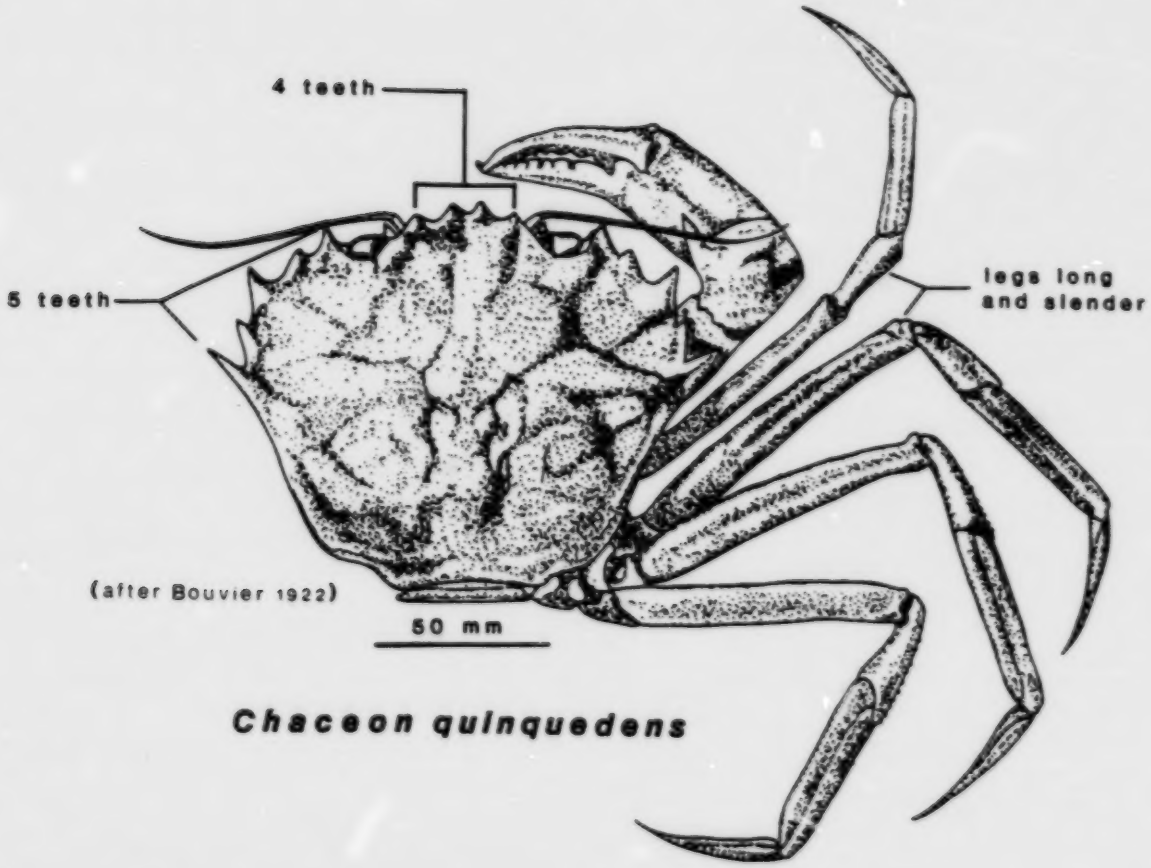


FAMILY GERYONIDAE - Deepsea crabs

HOW TO DISTINGUISH THE SPECIES:

1) ***Chaceon*** (previously ***Geryon***) ***quinquedens*** (Smith, 1879) - Red deepsea crab
   - usually dark red, but also pink and reddish brown
   - carapace longitudinally convex, hexagonal and wider than long in outline; blunt transverse ridge at widest part and deep grooves just lateral to midline; with 4 teeth between eye sockets and usually 5 anterolateral teeth, last lateral tooth most produced and pointing forward (in adults anterolateral teeth less prominent than shown below)
   - first leg bearing elongate pincer and 1 spine on each of the next two segments
   - walking legs very long and slender
   - to 180 mm CW
   - 66-2160 m, mostly between 300-900 m; 180-550 m on Scotian Shelf slope; in soft mud-clay based habitat; 4-13°C
   - Nova Scotia (43°N) to South Carolina

Note: populations of cream coloured rather than reddish crabs occurring further south (Florida) are now considered a separate species (*C. fenneri* Manning & Holtuis, 1984)



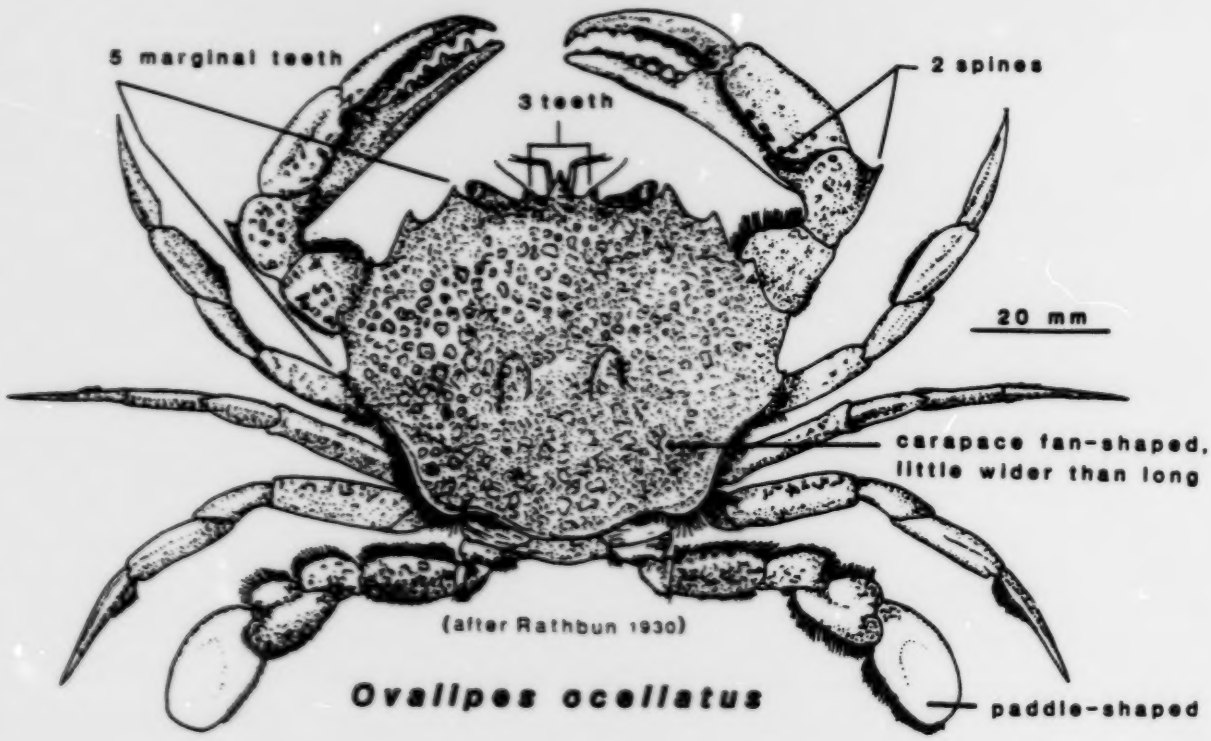
Chaceon quinquedens

FAMILY PORTUNIDAE - Swimming crabs

Remarks: *Carcinus maenas* is now (but was not until this century) the most common portunid in Canadian waters. It can be distinguished from other portunids by the distal segment of the last walking leg, which is flattened, but not broadened as in other species. *Callinectes sapidus* and *Portunus sayi* both have long lateral spines and, like *Ovalipes ocellatus*, are rare in Canadian waters.

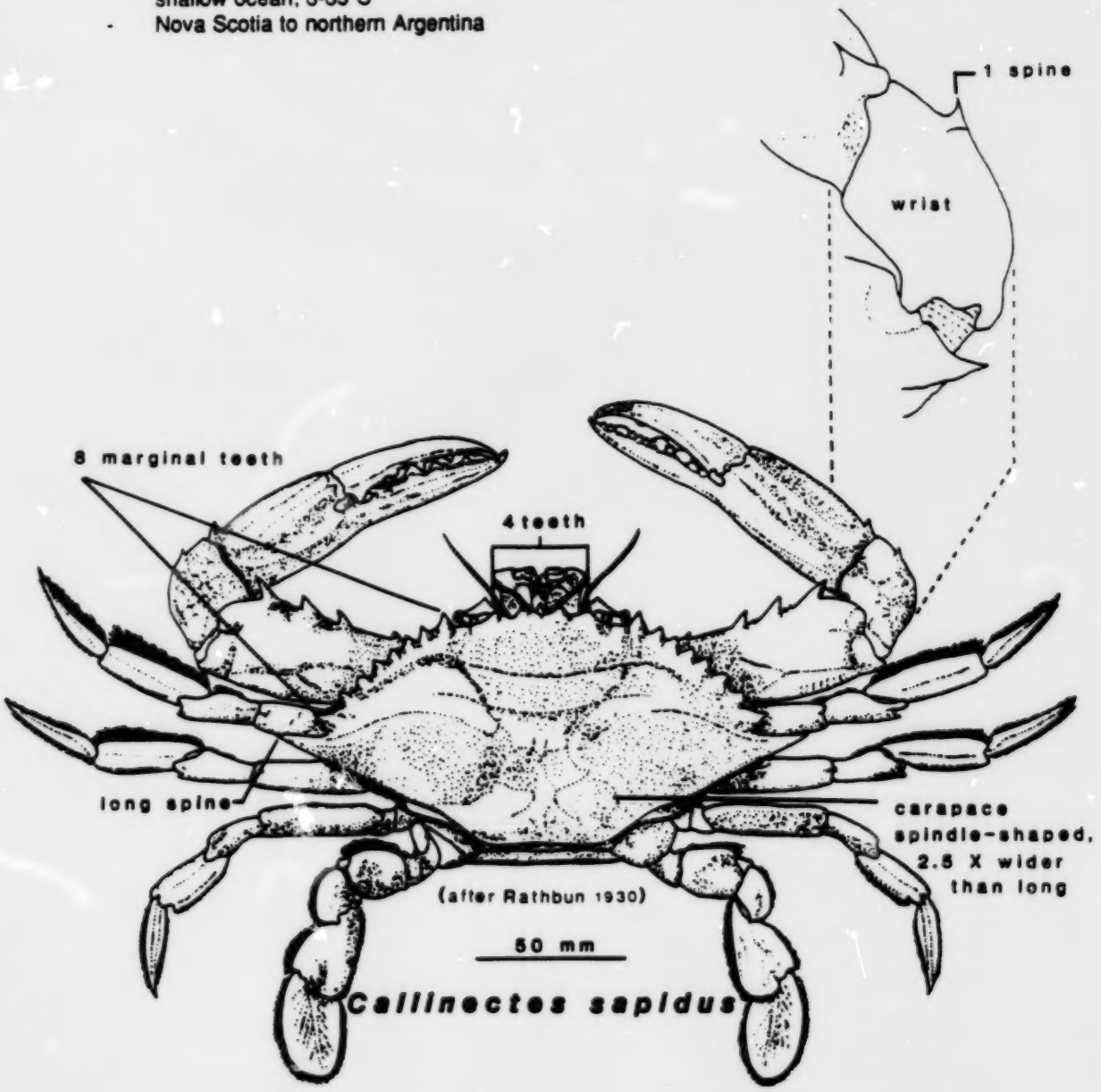
HOW TO DISTINGUISH THE SPECIES:

1) ***Ovalipes ocellatus*** (Herbst, 1799) - Lady crab
   - yellowish-grey carapace, with closely set rings of reddish-purple spots, iridescent spots between each pair of anterolateral spines; metallic iridescence on carapace and pincers, latter light brown, with blueish tips and purple spots on top
   - carapace fan-shaped, with 3 sharp teeth between eye sockets (middle tooth twice length of lateral teeth) and 5 anterolateral teeth curved forward; slightly (1/4) wider than long; convex and granular except for posterior central part of adults
   - pincers large and sharp, tips turned abruptly toward each other; segment next to pincer with spine on inner and outer side
   - last pair of walking legs paddle-shaped
   - male abdomen oblong
   - male to 87 mm CW, 64 mm CL; female to 60 mm
   - 0 (low tide) -95 m; especially on sand but also on rock, or mud bottoms; 8-24+°C
   - Prince Edward Island to Florida

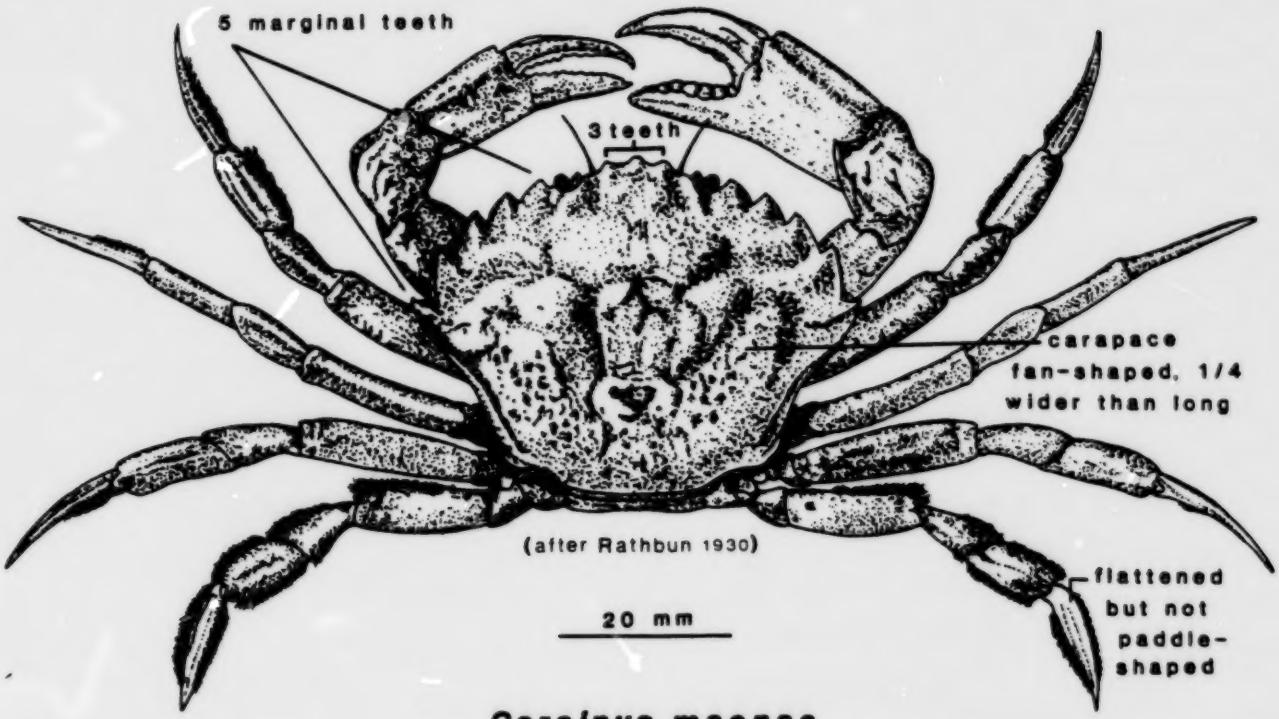


2) ***Callinectes sapidus*** Rathbun 1896 - Blue crab

- grayish or blueish-green with red spines; movable finger on pincer with blue in male, red in female; underside mostly white, with yellow and pink tints
- carapace spindle-shaped, with 4 triangular teeth between eye sockets, 8 sharp anterolateral teeth directed outward more than forward, and large lateral spine; 2.5 times wider than long; convex and mostly smooth, with few scattered granules tending to crowd into transverse ridges
- pincer with finely granulate ridges, wrist segment next to pincer with 1 outer spine
- last pair of walking legs paddle-shaped
- male abdomen T-shaped
- males to 209 mm CW (incl. lateral spines), 91 mm CL; females to 204 mm CW, 75 mm CL
- 0-90 m but commonly above 35 m; on a variety of bottoms in freshwater, brackish estuaries and shallow ocean; 3-35°C
- Nova Scotia to northern Argentina



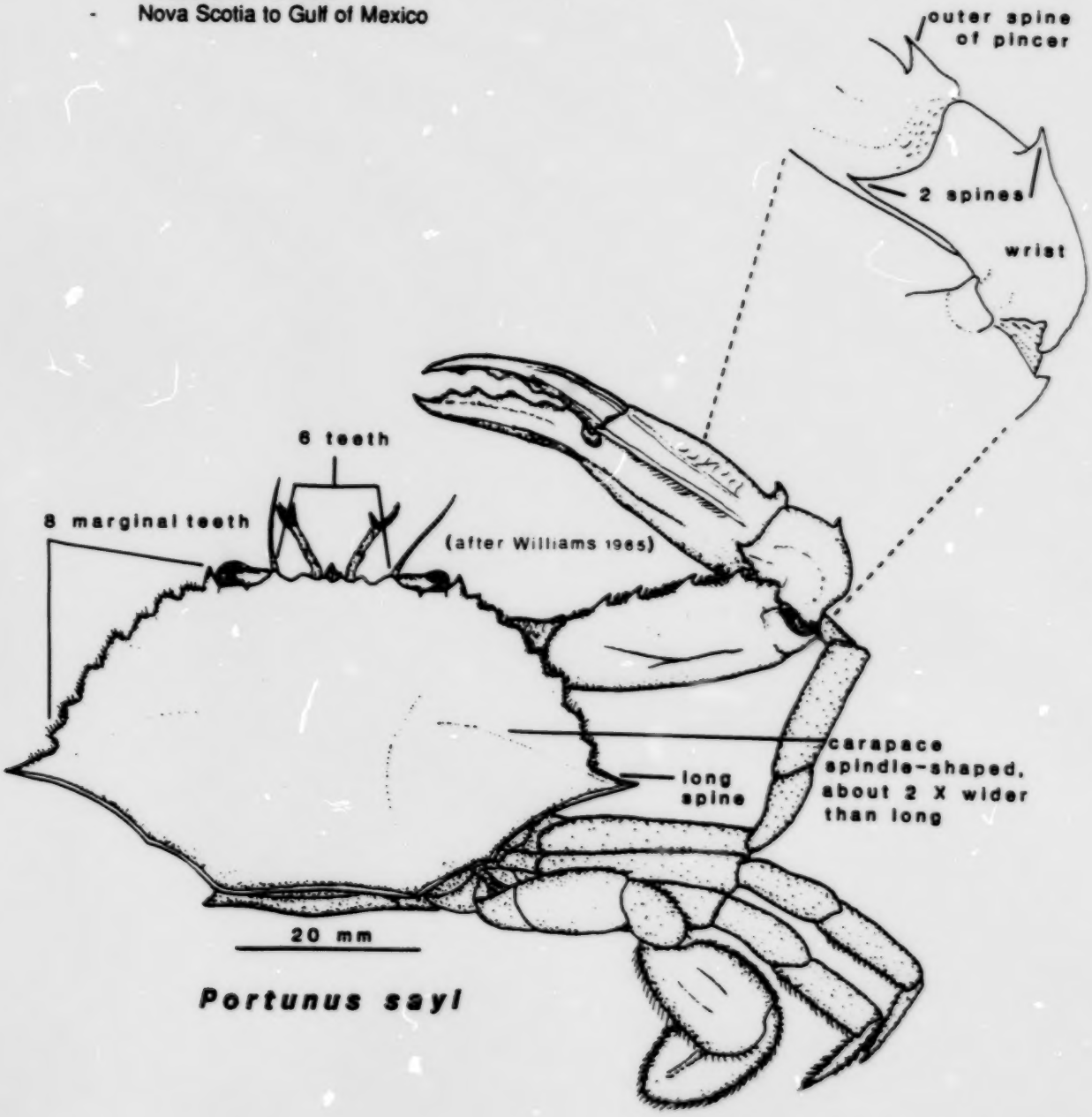
3) ***Carcinus maenas*** (Linnaeus, 1758) - Green Crab
- greenish upper carapace surface, with blackish mottlings; yellowish to orange-red (females) underneath; young variable in colour and pattern
- carapace fan-shaped, with 3 equal-sized rounded teeth between eye sockets and 5 anterolateral teeth curved forward toward side of each eye socket; slightly (1/4) wider than long;
- pincers nearly smooth, tips not turned abruply toward each other; segment next to pincer with inner tooth only
- last pair of walking legs distally flattened, but not paddle-shaped
- male abdomen triangular
- male and female to 79 mm CW, 60 mm CL
- 0-62 m, more rarely to 200 m; found in environments ranging from freshwater to hypersaline lagoons; under rocks, jetties and mud banks in wetlands, tidepools and shallow subtidal areas; 3-16+°C;
- Nova Scotia (not incl. Cape Breton) to Virginia



Carcinus maenas

4) ***Portunus sayi*** (Gibbes, 1850) - Sargassum swimming crab

- chocolate to light brown with cloudings of olive green and irregular whitish or flesh-coloured spots; orange spines on pincers
- carapace spindle shaped, with 6 blunt teeth between eye sockets, 8 anterolateral teeth, and large lateral spine; nearly twice as wide as long; smooth and polished to naked eye
- pincer with 5 longitudinal ridges and single spine on outer margin; wrist segment next to pincer with 2 spines (1 inner and outer), 4 spines on long segment beyond
- last pair of walking legs paddle-shaped
- male abdomen triangular
- males to 61 mm (incl. lateral spine), females to 64 mm CW; to 31 mm CL
- normally pelagic on surface among floating Sargasso Weed but also frequently found among weeds blown ashore
- Nova Scotia to Gulf of Mexico

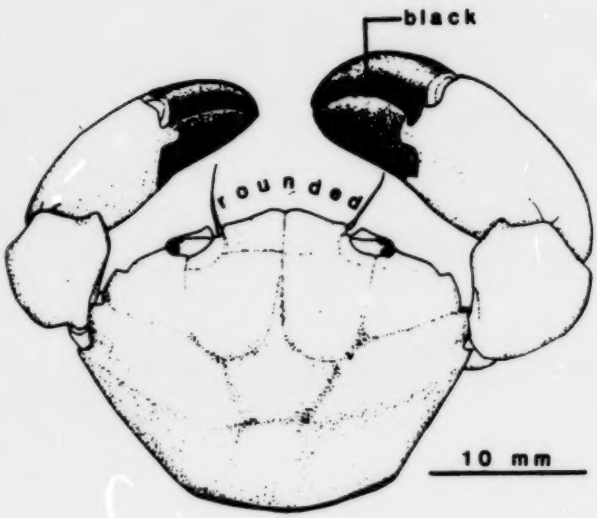


FAMILY XANTHIDAE - Mud crabs

HOW TO DISTINGUISH THE SPECIES:

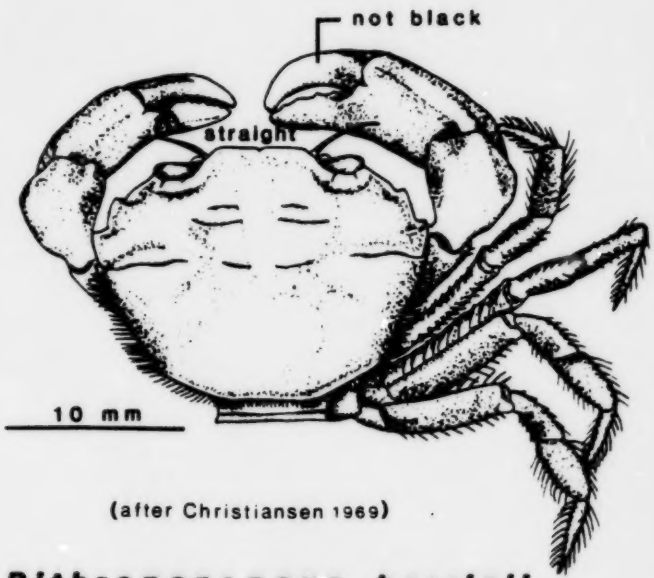
1) ***Dyspanopeus*** (formerly ***Neopanope***) ***sayi*** (Smith, 1869) - Say mud crab
   - carapace dark, slaty blue-green, brown or buff, with reddish or purplish speckles on yellowish backround
   - carapace fan-shaped, about 1/3 wider than long and rounded across front; *frontal margin between orbits without transverse groove*; 4 teeth lateral to eye-sockets, last three pointed, last two with oblique ridge extending inward and backward
   - unequal pincers on first legs; fingers black, color extending onto hand or palm
   - male 30 mm CW, 21 mm CL; female 20 mm CW, 14 mm CL
   - low tide mark to 46 m, on mud, oyster shell bottoms and sea grass beds in bays and brackish estuaries; 11-18+°C
   - Chaleur and Miramichi Bay, New Brunswick, Prince Edward Island and Cape Breton Island, Nova Scotia south to Gulf of Mexico

2) ***Rithropanopeus harrisii*** (Gould, 1841) - Harris mud crab, dwarf crab
   - carapace brownish above, paler below; fingers of pincer not black
   - carapace fan-shaped, only slightly wider than long and nearly straight across front; *frontal margin between orbits with transverse groove*; 4 teeth lateral to eye socket, last three pointed, last one with transverse ridge
   - unequal pincers on first legs; fingers not black
   - male 21 mm CW, 16 mm CL; female 16 mm CW, 12 mm CL
   - surface to 37 m, in estuarine environments (freshwater to 19 °/$_{oo}$)
   - Miramichi estuary, New Brunswick, to Gulf of Mexico



(after Williams 1965)

Dyspanopeus sayi



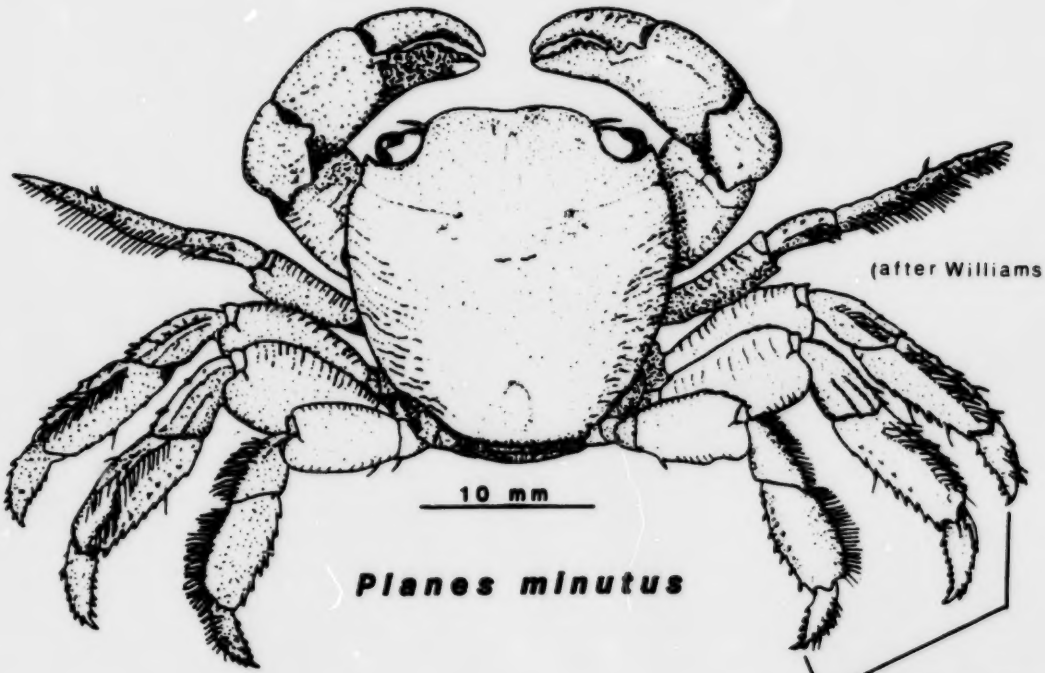
(after Christiansen 1969)

Rithropanopeus harrisii

FAMILY GRAPSIDAE - Grapsoid crabs

HOW TO DISTINGUISH THE SPECIES:

1) ***Planes minutus*** (Linnaeus, 1758) - Gulfweed crab; turtle crab; Columbus crab
   - coloration very variable; mottled irregularly with greenish-yellow or pale yellow on darker olive-green background; or reddish-fawn blotched with dark brown; usually with white spot laterally or on front of carapace
   - carapace as wide as long, subquadrate (young) to somewhat narrowed and laterally rounded (adult); smooth except for granulate edges
   - pincers large and heavy, smooth except for some granules; segment next to pincer with strong blunt spine on inner surface, 2-3 spines on segment beyond
   - walking legs with last three segments armed with thorns on inner margin, dense fringe of hairs on outer edge
   - to 19 mm CW and CL
   - normally pelagic on surface among floating Sargasso weed but also found on other flotsam or on floating and swimming organisms
   - south of Newfoundland to 11°N.



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GLOSSARY OF TERMS USED IN THE GUIDE

abdomen	body region posterior to carapace; the "tail"
antenna	second and more lateral of the 2 paired appendages on anterior end of body
antennule	first, or inner, paired appendage projecting from anterior end of body
anterior	of, pertaining to, or toward the front; "head end"; opposite of posterior
anterolateral	front side of a structure
biramous	two-branched, as opposed to uniramous or single-branch
carapace	"head shield", hard protective covering anterior to abdomen
cephalothorax	fused part of body anterior to abdomen
chela	"hand", claw or pincer of first pereiopod, consisting of the 2 distal segments, in which a movable finger opposes a fixed finger formed by a distal extension of the next to last segment
cheliped	whole appendage bearing chela or pincer
distal	situated away from point of origin or attachment; in limbs, furthest from body; opposite of proximal
dorsal	pertaining to the back; opposite of ventral
dorsolateral	upper side of a structure
endopod	inner branch of a two-branched appendage
epipod	process arising from basal joint of limb, which may extend into gill chamber
exopod	outer branch of a two-branched appendage
flagellum	the distal multiarticulate whip-like portion of antennules or antennae
longitudinal	running lengthwise
lateral	pertaining to the side; located away from the midline
maxilliped	one of 3 paired mouthparts anterior to pereiopods; most prominent third (outer) maxilliped resembles pereiopods
middorsal	upper middle of a structure
orbit	the region of the carapace nearest to the eyes
peduncle	the combined basal segments of antennules and antennae proximal to the flagellum
pereiopod	one of 5 walking limbs, with or without chela
pleopod	one of the paired swimming limbs on first 5 abdominal segments
posterior	of, or pertaining to, the rear end; opposite of anterior
proximal	toward or near to the point of origin or attachment, opposite of distal
rostrum	the "head spine", or anterior projection between eyes
seta(e)	bristle-like flexible outgrowth of body or appendage
shield	frontal calcified portion of carapace in hermit crabs, excluding softer posterior portion
spine	sharp and stiff outgrowth of body or appendage
sternum	totally or partially fused ventral plates of body segments
transverse	placed crosswise; running from side to side
tail fan	consisting of 2 pairs of uropods and telson
telson	terminal segment of abdomen
uniramous	single-branch, as compared to biramous or two-branched
uropod	one of paired appendages on last abdominal segment
ventral	pertaining to the underside, the side opposite the back (dorsal)